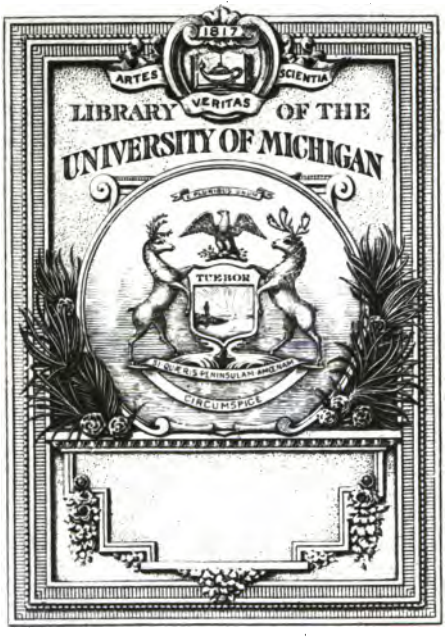

Edw. B. Hubley

A

KEY

TO THE

American Tutor's Assistant

REVISED;

IN WHICH ALL THE

EXAMPLES

NECESSARY FOR A LEARNER

ARE

WROUGHT AT LARGE;

AND ALSO

SOLUTIONS

GIVEN OF ALL THE

QUESTIONS FOR EXERCISE

IN THE VARIOUS

RULES.

Designed principally to facilitate the Labour of Teachers, and assist such as have not the Opportunity of a Tutor's Aid.

BY FREDERIC M'KENNEY,

PRECEPTOR OF YOUTH.

PHILADELPHIA.

PRINTED FOR JOSEPH CRUKSHANK.

1817.

DISTRICT OF PENNSYLVANIA, TO WIT:

BE IT REMEMBERED, That on the Tenth day of October, in the Thirty-fourth Year of the Independence of the United States of America, A. D. 1809, JOSEPH CRUKSHANK, of the said District, hath deposited in this Office, the Title of a Book, the Right whereof he claims as Proprietor, in the words following, to wit:

"A Key to the American Tutor's Assistant revised; in "which all the Examples necessary for a Learner are "wrought at large; and also Solutions given of all "the Questions for Exercise in the various Rules..... "Designed principally to facilitate the Labour of "Teachers, and assist such as have not the Oppor- "tunity of a Tutor's Aid. BY FREDERIC M'KENNEY, "Preceptor of Youth."

In Conformity to the Act of the Congress of the United States, entitled, "An Act for the Encouragement of Learning, by securing the Copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the Times therein mentioned." And also to the Act, entitled "An Act supplementary to an Act, entitled, "An Act, for the Encouragement of Learning, by securing the Copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the Time therein mentioned," and extending the Benefits thereof to the Arts of designing, engraving, and etching historical and other Prints."

D. CALDWELL, Clerk of the
District of Pennsylvania.

WE, whose names are underwritten, having examined a work, in manuscript, entitled, "A KEY TO THE AMERICAN TUTOR'S ASSISTANT," do highly approve of the manner in which it is performed; and from a persuasion that it is well calculated to afford a friendly aid to Teachers, in their arduous employment, as well as to young gentlemen desirous of revising their Arithmetical Studies, and who have not the opportunity of a Teacher's aid.....Do cheerfully recommend it as a Book well worthy to be encouraged, and introduced into Seminaries of Learning.

JAMES M'GINNESS, Harrisburg.
WILLIAM ALLISON, Middletown.
EDWARD M'CREA, Little Chickies.
JOSEPH JEFFERS, at Donegal Meeting-house.
PAUL BOGGS, Lancaster.
JOHN GALLIGHER, Lancaster.
T. JONES, Elizabeth-town.
NEAL M'CLOY.
JAMES DAVIS.

CONTENTS.

Explanation of Characters.

Signs.	*Significations.*
=	equal ; as $20s = L.1$
+	more ; as, $6+2=8$
—	less ; as, $8-2=6$
×	into, with, or multiplied by ; as $6\times2=12$
÷	by (i. e. divided by) as, $6\div2=3$; or, $2)6(3$
: :: :	proportionalty ; as $2 : 4 :: 6 : 12$
$\surd$ or $^2\surd$	Square Root ; as, $\sqrt{64}=8$
$^3\surd$	Cube Root ; as, $\sqrt[3]{64}=4$
$^4\surd$	Fourth Root ; as, $\sqrt[4]{64}=2$, &c.
———	a Vinculum ; denoting the several quantities, over which it is drawn, to be considered jointly as a simple quantity.

THE

KEY

TO THE

American Tutor's Assistant.

NUMERATION.

Answers to the Examples in this Rule.

Example	(1)	106	Example (6)	251600
	(2)	538	(7)	8142006
	(3)	6074	(8)	65104090
	(4)	12510	(9)	502304000
	(5)	45601	(10)	948632751

SIMPLE ADDITION.

EXAMPLES.

(1)	1261323	(2)	302808675
(3)	687214855	(4)	358433426
(5)	90988481		

Application.

(1)

5856
3840
395
265
25
3784
ans. 14165

(2)

	1718
	99
answer	1817

(3)

on bond	807
book accounts	1047
bills and notes	86
in cash	478
answer	*L.* 2418

(4)

the bond	4687	
interest	178	
amount	4865	dols.

(5)

1st purse	5784	
2d do.	588	
3d do.	84	
4th do.	779	
answer	7235	dols.

APPLICATION OF ADDITION.

(6) Nuts given 1st 357
2d 127
3d 78
4th 378
5th 57
Nuts given in all 997

(7) To his widow 3840
3 Sons { Eldest 6850, next Son 2584, next Son 2584 }
three Daughters { 1st dau. 1685, 2d do. 1685, 3d do. 1685 }
other legacies 950
answer 21863 dols.

(8)

	yds.
No. 1	367
2	367
3	407
4	407
5	407
6	228
7	228
8	228
9	300
10	300
answer	3239 yds.

(9)

	lbs.
No. 1	210
2	196
3	205
4	205
5	205
6	184
7	125
8	1274
answer	2604 lbs.

(10)

4 bales	52 pieces	1352 yds.
3 do.	40 do.	1098 do.
answer	92 pieces	2450 yds.

(11)

From the creation to the flood	1650 years.
To the calling of Abraham	427
To the building of the temple	909
To the founding of Rome	265
To the birth of Christ	752
Since do.	1809
answer	5813

(12) At one o'clock it strikes 1
2
3
4
5
6
7
8
9
10
11
12

Strikes in 12 hours 78 times
+ 78

ditto in 24 hours 156 times
156
156
156
156
156
156

answer 1092 times in a week.

(13) Less number 9876
Differ. twice as many { 9876 / 9876
The greater 29628

(14) Paid at sundry times { 89 / 196 / 226 / 327
yet to pay 162
Sum 1000 dols.

SIMPLE SUBTRACTION.

EXAMPLES.

(1) 375749613 (2) 599352989
(3) 81422543 (4) 679172963

Application.

(1) Borrowed *L.* 1090
Paid 909

remains 181

(2) 1809
1718

answer 91 years.

(3) From 1000
Sold 286
gave away 60 } +
lost 437

Take 783

Remains 217

(4) First purse 34
Second 50
Third 100
Fourth 150

From 334 to be paid,
Take 234 paid

answer 100 dol. purse.

(5) From Feet. 172

A 57
B 42

Take 99

answer 73 feet.

	lbs.		lbs.
Bought of A	175	gross	15 tare.
	175		15
of B	183		20
	183		20
	183		20
of C	196		17
	196		17
	196		17
	196		17

From 1683 gross 158 tare,
Take 158 tare.

Rem. 1525 neat.

(7) Due to A 478 *L.*
Interest thereon 98

From 576
First payment 199
Second ditto 199 +

Take 398

Remains *L.* 178 unpaid

	Pipes	gals.
(8) Bought	20	2459
Sold	14	1682
answer	6 pipes	777 gal.

(9) The bond *L.* 4700

At different payments: 1478, 1319, 826, 628

4251

Remains unpaid 449 *L.*

MULTIPLICATION.

CASE 1.

(1) Mul. 4513627 by 2 — Product 9027254

(2) 51473689 × 3 = 154421067

(3) 75134688 × 4 = 300538512

(4) 64132579 × 5 = 320662895

(5) 83174268 × 6 = 499045608

(6) 41379462 × 7 = 289656234

(7) 74136982 × 8 = 593095856

(8) 80736014 × 9 = 726624126

(9) 9761436 × 10 = 97614360

(10) 47140651 × 11 = 518547161

(11) 273406152 × 12 = 3280873824

(12) 96478362 × 12 = 1157740344

CASE 2.

(1) Mul. 5740632 by 4 × 8 = 32

22962528 × 8 = 183700224

(2) 3740016 × 8 × 7 = 56

29920128 × 7 = 209440896

(3) 7063115 × 8 × 12 = 96

56504920 × 12 = 678059040

(4) 7034652 × 12 × 12 = 144

84415824 × 12 = 1012989888

Examples agreeably to the Note.

(1) 6782158 × 14 = 94950212

(2) 6874281 × 15 = 103114215

(3) 2816054 × 16 = 45056864

(4) 5473682 × 17 = 93052594

(5) 4786824 × 18 = 86162832

(6) 6789863 × 19 = 129007397

CASE 3.

(1) 7643827 × 23 = 22931481 + 15287654 = 175808021

(2) 8142630 × 75 = 4071315 + 5699841 = 610697250

(3) 943617|0 × 92|0 = 1887234 + 8492553 = 8681276400

(4) 376041|0
484|0

1504164
3008328
1504164

18200384400

(5) 815036|000
703|00

2445108
5705252

57297030800000

(6) 190046|0
1615|00

950230
190046
1140276
190046

3[illegible]924290000

(7) 380092|0
8075|0

1900460
2660644
3040736

306924290000

(8) 6247386425
27356

37484318970
31236932475
18742159485
43731705465
12494772990

170903504957220

(9) 12494772990
13678

9995818392
8746341093
7496863794
3748431897
1249477299

170903504957220

(10) 47001881
1140090

423016929
188007524
47001881
47001881

53586374509290

(11) 94003762
570045

470018810
376015048
658026334
470018810

53586374509290

(12) 233926899
13679508

1871415122
1169634495
2105342091
1637488293
1403561394
701780697
233926899

3200004886285692

Application.

(1) 2564
40

answer 102560 dols.

(2) 46
5 × 7 = 35

230
7

ans. 1610 = sq. feet.

(3) 9876
× 6789

88884
79008
69132
59256

67048164

answer

(4) 342 Bales
7 × 8 = 56

2394
8

19152 = Pieces.
5 × 5 = 25

95760
5

478800 = yards.

(5) B. ps.
7 × 11 = 77 ps.
29

693
154

answer 2233 yds.

(6) B. P. ps.
4 × 9 = 36
4 × 12 = 48

Pieces = 84

Ps. yds. yds.
36 × 27 = 972
then 48 × 31 1488

yards 2460

(7) No. 1 & 2 each 367 × 2 = Yards. 734
3, 4 & 5 407 × 3 = 1221
6, 7 & 8 228 × 3 = 684
9 & 10 300 × 2 = 600
answer 3239 yds.

(8) 13572
4938
108624
40734
122202
54312
Product 67048164 ans.

(9) 126
× 109
1134
126
13734 Trees
1007
96138
13734
13830138 Apples.

(10) 52 Counties
× 42
104
208
2184 Parishes
× 246
13104
8736
4368
537264 Houses.
× 10
5372640 Persons.

SIMPLE DIVISION.

SHORT DIVISION.

EXAMPLES.

(1) 2)7346286
Quot. 3673143

(2) 3)5112896
1704298–2 rem.

(3) 4)37612285
9403071–1

(4) 5)97036142
19407228–2

(5) 6)74830956
12471826

(6) 7)91430682
13061526

(7) 8)37846210 — 4730776–2

(8) 9)73004881 — 8111653–4

(9) 10)47390172 — 4739017–2

(10) 11)41036294 — 3730572–2

(11) 12)64381259 — 5365104–11

(12) 12)59436828 — 4953069

Examples agreeably to Note first.

(1) 18 = 6)7463521 / 3)1243920–1 — Quotient 414640–1 rem.

(2) 48 = 6)73681090 / 8)12280181–4 — 1535022–34 rem.

(3) 96 = 8)740043612 / 12) 92505451–4 — 7708787–60 rem.

(4) 144 = 12)57384659 / 12) 4782054–11 — 398504–83 re.

LONG DIVISION.

EXAMPLES.

(2) 95)7461389(78540
665
811
760
513
475
388
380
89

(3) 671)5374608(8009
5368
6608
6039
569

(4) 2507)97[illegible]205(3883 Quo.
7521
22152
20056
20960
20056
9046
7521
1524

(5)

41659)756390289(18156
41659

339800
333272

65282
41659

236238
208295

279439
249954

29465

(6)

87648)9871369542(112625
87648

110656
87648

230089
175296

547935
525888

220474
175296

451782
438240

13542

(7)

175296)19742712000(112625
175296

221311
175296

460152
350592

1095600
1051776

438240
350592

876480
876480

(8)

476838)139736422224(293048
953676

4436882
4291542

1453402
1430514

2288822
1907352

3814704
3814704

(9) 293048)139736422224(476838
1172192

2251722
2051336

2003862
1758288

2455742
2344384

1113582
879144

2344384
2344384

Examples agreeably to the Note.

(1)
8146|00)85176425|00(10210
8146

17164
16292

8729
8146

Remainder 576500

(2)
1692|00)166341320|00(10210
16292

34213
32584

16292
16292

0

(3) 12749|000)87521885|000(6865
76494

110278
101992

82868
76494

63745
63745

(4) 2746|0000)35008754|0000(12749
2746

7548·
5492

20567
19222

13455
10984

24714
24714

Application.

(1) 136)3264(24 miles.
272

544
544

(2) 855 4275 5 Boys
4275

(3) 186 5022 27 *L.* each.
372

1302
1302

(4) 1763)8435955(4785 ans.
7052

13839
12341

14985
14104

8815
4415

(5) 7969)1864746(234 answer.
15938

27094
23907

31876
31876

(6) $14 = \begin{cases} 2)2072 \\ 7)1036 \end{cases}$

answer 148 Trees in a row.

(7)
$S5 = \begin{cases} 5)670320 \text{ Yards.} \\ 7)134064 \end{cases}$

$56 = \begin{cases} 7)\ 19152 \text{ Pieces.} \\ 8)\ 2736 \end{cases}$

answer 342 Bales.

(8)
$48 = \begin{cases} 6)15072 \\ 8)\ 2512 \end{cases}$

4)314 Gallons.

answer 78½ do. per hour

(9) 346)42904(124
346

830
692

1384
1384

(10)
$25 = \begin{cases} 5)45000 \text{ Dollars.} \\ 5)\ 9000 \end{cases}$

answer 1800 dolls. each.

(11) 256)46080(180 lb. in each.
256

2048
2048

0

FEDERAL MONEY.

ADDITION.

	E.	D.	d.	c.	m.
(1)	211	9	7	2	5

	D.	c.
(2)	27955	00

	D.	c.
(3)	1110	00

	E.	D.	d.	c.	m.
(4)	115	7	8	0	0

Application.

	D.	c.	m.
(1)	100	00	0
		75	0
	4	00	7
	19	04	0
answer	123	79	7

	D.	c.	m.
(2) An English guinea	4	66	7
A French crown	1	10	0
One do	1	10	0
Spanish pistole	3	77	3
One do.	3	77	3
One do.	3	77	3
answer	18	18	6

	E.	D.	d.	c.	m.
(3)	250	0	0	0	0
		9	0	0	0
			8	0	0
				6	0
					5
Facit	2509	8		6	5

		D.	c.
(4)	Due to A	462	50
	B	365	19
	C	23	64
	D	86	92
	E	35	74
	F	84	33
owes in all		1058	32

		D.	c.
(5)	Horse cost	125	00
	Chair	120	00
	Harness	26	45
	Saddle	16	43
	Bridle	4	16
Whole amount		292	04

		D.	c.
(6)	Notes	1055	00
	Gold	260	00
	Silver	3650	00
	Cents	2	50
Amount		4967	50

SUBTRACTION.

EXAMPLES.

	D.	cts.
(1)	132	22

	D.	cts.
(2)	1731	99

	D.	cts.
(3)	772	11

	D.	d.	c.	m.
(4)	6	2	2	7

	D.	c.
(5)	344	33

	E.	D.	d.	c.	m.
(6)	53	2	2	0	7

	D.	cts.
(7)	2277	84

	D.	cts.
(8)	913	05

	D.	cts.
(9)	3929	05

Application.

	D.	cts.
(1)	43	75
—	24	33
answer	19	42

	D.	c.
(2)	4967	50
—	3765	14
answer	1202	36

		D.	cts.
(3)		1965	44
Drawn for at sundry times.		960	00
		550	33
		69	29
—		1579	62
Remains		385	82

Borrowed	500	44	
Paid	204	56	
Remains	295	88	

(6)

D.	c.	m.
4700	00	0
95	15	0
109	37	0
7	1	2
—214	53	2
ans. 448 5	4	6 8

(5)

From an Eagle	10	00
Paid for Beef	1	33
Veal	1	75
Ducks	0	75
Butter	1	50
Vegetables	0	67
Take	6	00
Return	4	00

(7)

E.	D.	d.	c.	m.
	7	5	0	0
		7	5	0
			7	5
	—7	5	7	5
6	7	4	2	5 facit

MULTIPLICATION.

EXAMPLES.

(2) Multiply 376 by ,06 — Product 22,56

(3) 5345 ,08 — 427,60

(4) 3976 ,09 — 357,84

(6) 268 ,24 — 1072, 536 — 64,32

(7) 424 ,36 — 2544, 1272 — 152,64

(8) 576 ,48 — 4608, 2304 — 276,48

(10)

D.	c.	
439	,17	
	7	
3074	,19	Product

(11)

D.	d.	c.	m.
9	0	4	5
		2	9
262	3	0	5

(12)

D.	d.	c.	m.
7	3	6	8
			30
221	0	4	0

Application.

(1) 456 ,08 — answer 36,48

(2) 896 ,23 — 2688, 1792 — answer 206,08

(3) 976 2,14 — 3904, 976, 1952 — Dolls. 2088,64

(4) D.c. 6,33 ,84 — 2532, 1899 — Dols. 215,22

(5) Gals. 115 ,43 — 345, 460 — Dols. 49,45

(6) 6,75 — 6×6=36 — 40,50, 6 — *Facit* 243,00

(7) D.c. 3,43 296 — 2058, 3087, 686 — Dols. 1015,28

(8) 256 1,23 — 768, 512, 256 — answer 314,88

(9) lb. 3950 ,29 — 35550, 7900 — Dols. 1145,50

(10) 1945 Bar. 8,25 — 9725, 3890, 15560 — Dols. 16046,25

(11) 458 Bar. 3,50 — 22900, 1374 — Dols. 1603,00

DIVISION.

EXAMPLES.

2)356,56 — Quotient 178,28

3)338,45 — 112,81⅓

4)2896,44 — 724,11

Dols.cts. 5)6238,44 — 1247,68⅘

Dols.cts. 7)3862,19 — 551,74–1

Dols.cts. 9)2384,27 — 264,91–8

15 = { 3)6238,44 by 15
5)2079,48
415,89–9 remain.

25 = { 5)2476,23 by 25
5)495,24–3
99,04–4 } 23 rem.

33 = { 3)3852,10 by 33
11)1284,06–1
116,73–3 } 10 rem.

5)2384,27 by 45
9)476,85–2
52,98–3 } 17 rem.

52)3278,94(63,05
312
158
156
294
260
Remainder 34

56)2954,76)52,76
280
154
112
427
392
356
336
20

67)3758,39(56,09+
335
408
402
639
603
36

75)9645,75(128,61
75
214
150
645
600
457
450
75
75

87)5798,94(66,65
522
578
522
569
522
474
435
39

Application.

(1) 4)24,32

Facit dols. 6,08

(2) D.c.m. c. m.
112)1400,0(,12,5 answer.
112
280
224
560
560

(3) D.c.
196)7,84),04
787

(4) D.c. c.m.
125)8,50(,06,8 per shad.
750
1000
1000

c. m.
then ,06,8
×25
340
136
answer dols. 1,70,0

(5) D. c. D.c.
34)215,22(6,33 answer.
204
112
102
102
102

(6) D. c. D.c.
126)189,00(1,50 ans.
126
630
630

(7) D.c.
115)49,45),43 cents answer.
460
345
345

COMPOUND ADDITION.

EXAMPLES.

(2) *L.* 23957 13 5 (3) *L.* 20000 (4) *L.* 1820 19 4½
(5) *L.* 1806 18 1¾ (6) *L.* 2377 1 8¾ (7) *L.* 43451 18 3
(8) *L.* 42638 14 3¼ (9) *L.* 40632 12 5½

Application.

(1)
He owes in all *L.* 2114 1 10½

(2)

	L.	*s.*	*d.*
Value of the Bond	1908	17	10½
Interest of do.	191	2	1½
amount *L.*	2100	0	0

(3)

	L.	*s.*	*d.*
Wine cost	684	0	0
Loading &c.	17	13	8½
Storage	8	10	0
Custom	16	13	9½
Carriage	19	14	6½
amount *L.*	746	19	0½

(4)

	L.	*s.*	*d.*
Widow's use	6436	0	0
Charities	297	14	8
1st Nephew	1546	14	8
2d do.	1546	14	8
3d do.	1546	14	8
1st Nice	1324	0	0
2d do.	1324	0	0
3d do.	1324	0	0
Executor	304	0	11
L.	15649	19	7

(5)

	L.	*s.*	*d.*
First payment	13	18	9
2d do.	23	18	4½
3d do.	47	0	9
Remainder	37	14	6½
Sum borrowed	122	12	5½

(6)

	L.	*s.*	*d.*
1st Horse	16	17	4
2d do.	16	17	4
3d do.	16	17	4
1st Cow	5	14	7
2d do.	5	14	7
3 Bushels wheat	0	18	10½
Amount	63	0	0½

(7)

	L.	*s.*	*d.*
Brewer	42	3	3
Butcher	212	0	6
Baker	24	0	0
Chandler	13	8	0
Taylor	137	9	9
Draper	74	13	6
Rent	50	0	0
Servant's wages	46	5	0
took with him	100	0	0
Draws for *L.*	700	0	0

(8)

	L.	*s.*	*d.*
A owes	109	19	11½
C owes	109	19	11½
	109	19	11½
A & C	329	19	11½
D as much	329	19	11½
Sum due to B	659	19	10½

TROY WEIGHT.

EXAMPLES.

(1) lbs. oz. dwt. gr.
36 10 13 13

(2) lbs. oz. dwt. gr.
346 8 18 20

(3) lbs. oz. dwt. gr.
906 0 10 9

Application.

(1)

	lb.	oz.	dwt.	gr.
	36	7	16	0
	48	7	0	16
	56	6	0	0
ans. lbs.	141	8	16	16

(2)

		lb.	oz.	dwt.	gr.
3 Ingots	1st	9	7	14	0
	2d	9	7	14	0
	3d	9	7	14	0
4 do.	1st	8	5	15	16
	2d	8	5	15	16
	3d	8	5	15	16
	4th	8	5	15	16
Whole wt. lbs.		62	10	4	16

(3)

		lb.	oz.	dwt.
4 Tankards	1st	0	7	18
	2d	0	7	18
	3d	0	7	18
	4th	0	7	18
Spoons		4	6	0
3 Salvers	1st	6	4	0
	2d	6	4	0
	3d	6	4	0
answer		26	1	12

(4)

	lb.	oz.	dwt.
14 Dishes wt.	18	3	14
36 Plates	48	1	15
6 Salts	5	7	0
4 Salvers	11	10	12
Whole wt.	83	11	1

(5)

		lb.	oz.	dwt.	gr.
3 pr. Sleeve Buttons.	1st	0	0	0	11
	2d	0	0	0	11
	3d	0	0	0	11
Two Basins		1	5	4	14
2 pair Buckles	1st	0	2	11	0
	2d	0	2	11	0
answer		1	10	7	23

(6)

	lb.	oz.	dwt.	gr.
Dishes wt.	11	4	16	11
Plates 3 times as much	11	4	16	11
	11	4	16	11
	11	4	16	11
Salts	2	5	6	14
Tankards	6	7	14	17
answer	54	8	7	3

AVOIRDUPOIS WEIGHT.

EXAMPLES.

(1) T. C. qr. lb.
310 3 2 18

(2) C. qr. lb. oz. dr.
332 1 18 11 11

(3) C. qr. lb. oz. dr.
290 0 1 3 10

Application.

(1)	C.	qr.	lb.
No. 1	9	2	18
2	8	3	12
3	7	2	19
	26	0	21

(2)	C.	qr.	lb.	oz.	dr.
No. 1	0	1	19	14	12
2	0	2	1	11	10
3	2	2	11	14	10
4	0	3	6	9	15
	4	1	12	2	15

(3)	C.	qr.	lb.
No. 1	3	2	18
2	2	3	12
3	1	3	19
4	3	3	7
5	2	1	18
	14	2	18

(4)	C.	qr.	lb.
No. 1	2	2	0
2	2	1	16
3	2	0	8
4	2	3	0
5	2	1	12
6	2	1	16
	14	1	19

(5)	C.	qr.	lb.
No. 1	12	3	17
2	11	0	14
3	11	0	14
4	7	3	17
5	7	3	17
6	7	3	17
	58	3	12

(6)	Qr.	lb.
1st Bag	2	15
2d	2	25
3d	2	25
4th	2	25
5th	2	25
6th	2	25
	4	1	0

APOTHECARIES WEIGHT.

Examples.

(1) lb. ℥ ʒ ℈ gr.
35 10 4 1 12

(2) lb. ℥ ʒ ℈ gr.
276 7 6 2 16

Application.

	℥	ʒ	℈	gr.
1st Simple	3	4	1	0
2d	4	3	2	0
3d	0	4	0	18
4th	6	5	2	18
answer oz.	15	2	0	16

LONG MEASURE.

Examples.

(1) Deg. M. fur. P.
33 51 6 34

(2) Yds. ft. in. b.c.
3458 0 10 1

Application.

From Phila. to the	M.	fur.	P.
Blue Ball	20	3	30
Red Lion	40	2	16
Harris's ferry	42	3	9
Carlisle	17	0	0
Pittsburg	201	0	2
answer	321	1	17

CLOTH MEASURE.

EXAMPLES.

(1) Yds.	qr.	na.	(2) E.E.	qr.	na.	(3) E.F.	qr.	na.
296	2	0	311	1	1	370	4	2

Application.

(1)

	Yds.	qr.	na.
No. 1	27	2	3
2	41	3	2
3	36	1	2
4	33	2	1
answer yds.	139	2	1

(2)

	Yds.	qr.	na.
No. 1	382	0	2
2	382	0	2
3	407	3	2
4	407	3	2
5	407	3	2
6	223	1	1
7	223	1	1
8	223	1	1
9	223	1	1
10	223	1	1
Total yds.	3104	1	3

LAND MEASURE.

EXAMPLES.

(1) A.	R.	P.	(2) A.	R.	P.	(3) A.	R.	P.
324	2	35	2844	2	27	2509	1	34

Application.

(1)

	A.	R.	P.
One field	27	3	27
Another	17	3	36
A third	41	3	19
answer	87	3	2

(2)

		A.	R.	P.
One wheat field		37	0	23
One rye do.		25	2	0
Two pasture fields	1st	17	1	11
	2d	17	1	11
In meadow		21	0	14
In wood land		42	2	26
answer		161	0	5

LIQUID MEASURE.

EXAMPLES.

(1) T.	hhd.	gal.	(2) Gal.	qt.	pt.	(3) Gal.	qt.	pt.
30	2	47	3468	1	0	10195	1	1

Application.

(1)

	Gal.	qt.	pt.
1st Vessel	120	2	1
2d	238	0	0
3d	136	0	0
4th	118	1	0
answer	632	3	1

(2)

	Gal.	qt.	pt.
The 4 First hhds. each	97	1	0
	97	1	0
	97	1	0
	97	1	0
2 last each	102	3	1
	102	3	1
answer	594	3	0

DRY MEASURE.

EXAMPLES.

(1) Bu.	P.	qt.	(2) Bu.	P.	qt.	(3) Bu.	P.	qt.
347	3	5	3651	1	3	11598	2	2

Application.

(1)

Bu.	P.	qt.
14	2	5
23	3	0
8	0	7
19	1	0
59	0	4
ans. 125	0	0

(2)

	Bu.	P.	qt.
4 Granaries each	87	2	0
	87	2	0
	87	2	0
	87	2	0
2 do. each	100	0	7
	100	0	7
answer	550	1	6

TIME.

EXAMPLES.

(1) Years	m.	w.	d.	(2) Days	hr.	min.	sec.
3393	9	1	5	3166	21	48	54

Application.

(1)

	mo.	da.
1st		31
2d		28
3d		31
4th		30
5th		31
6th		30
7th		31
8th		29
answer		241 st.

(2)

	mo.	da.
	3	31
	4	30
	5	31
	6	30
	7	31
	8	31
	9	30
	10	31
	11	19
answer		263

	Y.	m.	w.	d.
A's age	27	5	2	0
B's	25	0	0	0
C's	20	7	3	4
D's	17	0	0	4
E's	14	11	1	0
F's	14	11	1	0
G's	12	1	0	6
answer	131	11	1	0

MOTION.

EXAMPLES.

(2) 37° 46′ 30″ (2) 9*sig.* 27° 38′ 42″

COMPOUND SUBTRACTION. OF MONEY.

(1) *L.* 4818 8 4¾ (2) *L.* 482 11 10¼ (3) *L.* 699 3 5½

Application.

(1)

	L.	*s.*	*d.*
A	138	14	6
B	87	16	4½
answer.	50	18	1½

(2)

	L.	*s.*	*d*
Brewer	756	17	0
Baker	437	17	8¾
in the baker's	318	19	3¼

(3)

	L.	*s.*	*d*
From	2000	0	0
1st payment	499	19	11¾
2d do.	1388	18	11
Take	1888	18	10¾
answer.	111	1	1¼

(4)

	L.	*s.*	*d.*
Principal	792	11	2½
Interest	193	12	9¾
From	986	4	0¼
received in part pay	190	17	4½
	279	11	7¾
	198	19	10¼
	98	12	9¾
Take	776	1	8¼
remains	210	2	4

(5)

	L.	*s.*	*d.*
C.D's bill	75	0	0
R. Drawer's note	7	12	6
P. Johnson's do.	5	0	0½
Assig. on R. Dealer	17	13	9
Bank notes.	40	0	0
from 75*L.* deduct	70	6	3½
remains *L.*	4	13	8½

(6) From *L.* 74 17 0 = A's sum,
unpaid. Take 49 13 6 = differ.
answer 25 3 6 = B's sum.

(7)

	L.	*s.*	*d.*
From	125111	10	6
	11000	0	0
	1111	11	11
Take	12111	11	11 = Daughter's.
answer	12999	18	7 = Son's.

(8)

He owes to	L.	s.	d.
A	71	12	6
B	34	9	9
C	16	18	8
D	44	0	0
E	66	7	6
F	11	2	3
G	19	19	0
H	20	0	0
From	284	9	8
Take	192	19	3
They lose	91	10	5 answer.

He had in cash	L.	s.	d.
	3	13	6
Commodities	23	10	0
Furniture	21	6	11
Tenement	56	15	0
Book debts	87	15	10
L.	192	19	3

TROY WEIGHT.

Example. (2) 29 lb. 0 oz. 6 dwt. 20. gr.

Application.

(1)

	lb.	oz.	dwt.	gr.
From	637	9	0	8
Take	288	10	9	20
	348	10	10	12

(2)

	lb.	oz.	dwt.	gr.
From	204	6	10	0
Take	108	6	1	13
	95	11	18	11

AVOIRDUPOIS WEIGHT.

(1) T. C. q. lb. 23 18 0 22

(2) T. C. qr. lb. 27 18 0 17

(3) C. qr. lb. oz. dr. 10 1 18 15 6

Application.

(1)

	C.	qr.	lb.
From	45	1	7
Take	39	0	20
Remains	6	0	15

(2)

	T.	C.	qr.	lb.
From	17	7	2	0
Take	0	12	3	9
Remains	16	14	2	19

(3)

	C.	qr.	lb.		lb.
1st Cask	1	3	12	Tare	17
2d	1	3	12		17
3d	1	3	12		17
4th	1	3	12		17
5th	1	3	12		17
6th	1	3	12		17
From	11	0	16		3 18
Take	0	3	18	tare	
answer	10	0	26		

(4)

	C.	qr.	lb.		qr.	lb.
2 first hhds.	37	3	0	Tare	3	17
3d	13	2	4		1	10
4th	13	2	4		1	10
	64	3	8		1	2 9
	1	2	9	tare		
answer	63	0	27	neat wt.		

APOTHECARIES WEIGHT.

EXAMPLES.

(1) lb. ℥ ʒ ℈ gr.
2 8 1 0 13

(2) lb. ℥ ʒ ℈ gr.
11 3 4 2 2

Application.

(1)
lb. ℥ ʒ ℈ gr.
3 3 1 1 12
1 7 0 2 18
rem. left 1 8 0 1 14

(2)
lb. ℥ ʒ ℈ gr.
From 17 11 6 2 0
First parcel 3 5 4 1 17
Second do. 3 5 4 1 17
Third do. 3 5 4 1 17
Take 10 4 5 2 11
Left 7 7 0 2 9

LONG MEASURE.

EXAMPLES.

(1) Deg. M. fur. P.
2 4 6 25

(2) Yds. ft. in. b. c.
175 2 5 1

(3) Yds. ft. in. b. c.
76 2 3 2

Application.

(1)
L. M. fur. P. yd.
50 2 1 0 0
19 0 0 18 4
rem. 31 2 0 21 1½

(2)
M. fur. P.
1st day 21 5 0
2d 40 0 26
3d 5 4 0
B travels 67 1 26

M. fur. P.
1st day 60 0 0
2d 57 0 35
3d 52 6 0
C travels 169 6 35

M. fur. P.
Then from 327 0 0
67 1 26
169 6 35
Take 237 0 21
They are asunder 89 7 19

CLOTH MEASURE.

EXAMPLES.

(1) Yds. qr. na.
27 2 3

(2) E. F. qr. na.
22 1 2

(3) E. E. qr. na.
66 4 3

Application.

(1)
E. E. qr. na.
From 156 0 0
Take 50 1 1
rem. 105 3 3

(2)
Yd. qr. na. in.
From 856 0 0 0
Take 200 2 1 1
rem. 655 1 2 1¼

(3) Yds. qr. na.
27 2 3+27 2 3+27 2 3+27 2 3 = 110 3 0
(4) Yds. qr. na. — 87 3 0
42+42+42 = 126 0 0
yd. yd.qr.na. remains 22 3 1
42+27 1 2 = 69 1 2
answer 56 2 2

LAND MEASURE.

EXAMPLES.

(1) A. R. P. 67 2 28
(2) A. R. P. 63 1 3
(3) A. R. P. 325 1 19

Application.

(1) A. R. P.
From 780 2 0
Take 396 3 15
383 2 25

(2) A. R. P.
From 4780 3 30
1784 3 24 = A's
1658 2 36 = B's
Take 3443 2 20
rem. 1337 1 10 = C's

(3) A. R. P.
Bought at sundry times { 47 0 0, 174 0 37, 200 3 0, 470 3 0
From 892 2 37
First sale 300 0 27
Second 275 0 0
Take 575 0 27
Acres 317 2 10 left.

LIQUID MEASURE.

EXAMPLES.

(1) T.hhd. gal. 7 2 22
(2) T.hhd. gal. 13 1 13
(3) Hhd. gal. qt. pt. 7 54 2 1

Application.

(1) T.hhd. gal. qt.
From 2 0 0 0
Take 0 3 15 3
answer 1 0 47 1

(2) Gal. qt. pt.
From 10007 0 0
Take 4005 2 1
remains 6001 1 1

(3)	Gal.	qt.	pt.
Bought of A	174	3	0
——of B	174	3	0
	174	3	0
	7	0	1
	531	1	1
C as much as A&B	531	1	1
	1062	3	0

then from	1062	3	0
Sold to D	197	0	1
to E	197	0	1
	197	0	1
	197	0	1
	10	3	0
Take	799	1	0
remains	263	2	0

DRY MEASURE.

EXAMPLES.

(1)	Bu.	P.	qt.
	12	2	5

(2)	Bu.	P.	qt.
	43	2	4

(3)	Bu.	P.	qt.
	273	0	5

Application.

(1)	Bu.	P.	qt.	pt.
From	27	1	0	0
Take	18	2	0	1
ans.	8	2	7	1

(2)	Bu.	P.	qt.
	1000	0	7
	734	1	5
	265	3	2

(3)	Bu.	P.	qt.
	500	0	0
	375	2	6
	124	1	2

TIME.

Examples. (1)	Y.	m.	w.	d.
	809	5	1	4

(2)	D.	hr.	min.	sec.
	165	23	59	59

Application.

(1)	Y.	m.	w.	d.	h.	min.	sec.
From	200	0	0	0	0	0	0
Take	98	3	0	0	8	0	10
answer	101	9	3	6	15	59	50

(2)	Y.	m.	w.	d.
From	6	0	0	0
Take	5	8	3	4
Facit	4	0	3	

(3)	Y.	m.	w.	d.
From	14	0	0	0
	11	11	0	0
11 weeks =	2	3	0	
11 days =	0	1	4	
Take	12	1	0	4
answer	1	11	3	3

(5)	Y.	m.	d.
From	1771	4	9
Take	1765	2	21
difference	6	1	16

(6)	Y.	m.	d.
From	1789	10	12
Take	1787	2	22
The time	2	7	18

(7)

	Y.	m.	d.
From	1777	9	21
Take	1775	2	26
Dif. of A&B	2	6	23

	Y.	m.	d.
From	1778	12	25
Take	1777	9	21
	1	3	4 Dif. of B&C

	Y.	m.	d.
From	1778	12	25
Take	1775	2	26
	3	9	27 dif. of A&C. Then

Y.	m.	d.	Y.	Y.	m.	d.	
1775	2	26	+21 =	1796	2	26	the time when A will be 21
1777	9	21	+21 =	1798	9	21	do. for B
1778	12	25	+21 =	1799	12	25	do. for C. answer.

(8)

	Y.	m.	d.		Y.	m.	d.		Y.	m.	d.
From	1764	6	16	From	1790	1	1	From	1790	1	1
Take	1746	6	13	Take	1746	6	13	Take	1764	6	16
	18	0	3		43	6	18	B's age	25	6	15
deduct	0	0	11		0	0	11				
differ.	17	11	22		43	6	7 A's age				

MOTION.

EXAMPLES.

(1) 3° 53′ 33″ (2) 3*sig.* 28° 27′ 26″ (3) 1*sig.* 29° 17′ 26″

Application.

(1)	*sig.*	°	′	″	(2)	*sig.*	°	′	″
From	7	2	17	51	From	12	0	0	0
Take	3	12	51	57	Take	9	9	9	9
Remainder	4	8	25	54	answer	2	20	50	51

COMPOUND MULTIPLICATION.

EXAMPLES.

(1)	*L.*	*s.*	*d.*
	49	12	8

(2)	*L.*	*s.*	*d.*
	5927	13	9

(3)	*L.*	*s.*	*d.*
	5927	13	9

(4)	lb.	oz.	dwt.	gr.
	19	9	15	18

(5)	T.	C.	qr.	lb.	oz.	dr.
	20	13	3	9	12	13

(6)	lb.	℥	ʒ	℈	gr.
	15	11	7	1	12

(7) Deg. m. fur. P.
34 34 7 20

(8) Yds. ft. in. b. c.
1127 0 10 0

(9) Yds. qr. na.
342 0 2

(10) E. F. qr. na.
276 2 0

(11) E. E. qr. na.
619 3 1

(12) A. R. P.
789 3 0

(13) T. hhd gal qt. pt.
54 3 6 2 1

(14) Bu. P. qt.
467 2 4

(15) Y. m. w. d.
5721 11 2 2

(16) D. hr. m. sec.
221 10 53 36

(17) *sig.* ° ′ ″
7 9 15 40

(18) *sig.* ° ′ ″
32 23 32 6

CASE 1.

EXAMPLES.

(2) Mul. by 5

s.	*d.*
7	6
L. 1 17	6

(3)

L.	*s.*	*d.*
1	18	6
		6
11	11	0

(4)

s.	*d.*
2	10½
	3
8	7½

(2)

s.	*d.*
3	9
	10
1 17	6

(3)

s.	*d.*
19	3
	12
11 11	0

(4)

s.	*d.*
0	11½
	9
8	7½

(5)

L.	*s.*	*d.*
2	14	8¾
		11
30	2	0¼

(6)

s.	*d.*
9	11¼
	4
1 19	9

(6)

3	3¾
	12
1 19	9

CASE 2.

EXAMPLES.

(2) 16 at

s.	*d.*
7	10
	4×4=16
1 11	4
	4
6 5	4

(2) 32 at

s.	*d.*
3	11
	4×8=32
15	8
	8
6 5	4

(3) *L. s. d.*
27 at 1 2 10½
3×9=27
3 8 7½
9
Facit 30 17 7½

(3) *L. s. d.*
54 at 0 11 5½
6×9=54
3 8 7½
9
Facit 30 17 7½

(4) *L. s. d.*
50 at 0 17 11½
5×10=50
4 9 9½
10
Facit 44 17 11

(4) *L. s. d.*
100 at 0 8 11½
10×10=100
4 9 9½
10
Facit 44 17 11

(5) *L. s. d.*
66 at 7 9 6
6×11=66
44 17 0
11
Facit 493 7 0

(5) *L. s. d.*
132 at 3 14 9
11×12=132
41 2 3
12
Facit 493 7 0

(6) *L. s. d.*
72 at 9 18 11½
6×12=72
59 13 9
12
Facit 716 5 0

(6) *L. s. d.*
144 at 4 19 5¾
12×12=144
59 13 9
12
Facit 716 5 0

CASE 3.

EXAMPLES.

(2) *L. s. d.*
43 at 0 17 8×1
6×7+1=43
5 6 0
7
37 2 0
0 17 8
Fac. 37 19 8

(2) *L. s. d.*
86 at 0 8 10×2
7×12+2=86
3 1 10
12
37 2 0
0 17 8
Facit 37 19 8

(3) L. s. d.
58 at 0 0 $9\frac{1}{2}\times4$
$6\times9+4=58$

0	4	9
		9
2	2	9
0	3	2
2	5	$11\frac{1}{2}$

Facit

(3) L. s. d.
116 at 0 0 $4\frac{3}{4}\times8$
$9\times12+8=116$

0	3	$6\frac{3}{4}$
		12
2	2	9
0	3	2
2	5	11

Facit

(4) L. s. d.
74 at 0 12 8×2
$9\times8+2=74$

5	14	0
		8
45	12	0
1	5	4
46	17	4

Facit

(4) L. s. d.
148 at 0 6 4×4
$12\times12+4=148$

3	16	0
		12
45	12	0
+1	5	4
46	17	4

Facit

(5) L. s. d.
76 at 0 15 $11\frac{1}{2}\times1$
$7\times11-1=76$

5	12	$8\frac{1}{2}$
		11
61	8	$9\frac{1}{2}$
—0	15	$11\frac{1}{2}$
60	12	10

Facit

(5) L. s. d.
152 at 0 7 $11\frac{1}{2}\times8$
$12\times12+8=152$

4	15	9
		12
57	9	0
+3	3	10
60	12	10

Facit

(6) L. s. d.
78 at 8 7 0×1
$7\times11+1=78$

58	9	0
		11
642	19	0
+8	7	0
651	6	0

Fa.

(6) L. s. d.
156 at 4 3 6×12
$12\times12+12=156$

50	2	0
		12
601	4	0
+50	2	0
651	6	0

Facit

CASE 4.

EXAMPLES.

(2) 195 at L. 0 1 2×5 / 10 / 0 11 8×9 / 10 / 5 16 8 / 5 5 0 / 0 5 10 / L. 11 7 6

(2) 390 at L. 0 0 7 / 10 / 0 5 10×2 / 10 / 2 18 4 / 3 / 8 15 0 / 2 12 6 / L. 11 7 6

(3) 407 at L. 0 8 3×7 / 10 / 1 12 6 / 10 / 16 5 0 / 4 / 65 0 0 / 1 2 9 / Facit 66 2 9

(3) 814 at L. 0 1 $7\frac{1}{2}$×4 / 10 / 0 16 3×1 / 10 / 8 2 6 / 8 / 65 0 0 / 0 16 3 / 0 6 6 / Facit 66 2 9

(4) 875 at L. 0 14 3×5 / 10 / 7 2 6×7 / 10 / 71 5 0 / 8 / 570 0 0 / 49 17 6 / 3 11 3 / Facit 623 8 9

(4) 1750 at L. 0 7 $1\frac{1}{2}$ / 10 / 3 11 3×5 / 10 / 35 12 6×7 / 10 / 356 5 0 / 249 7 6 / 17 16 3 / Facit 623 8 9

(5) *L. s. d.*
3540 at 2 5 0
10
22 10 0×4
10
225 0 0×5
10
2250 0 0
3
6750 0 0
1125 0 0
90 0 0
facit 7965 0 0

(5) *L. s. d.*
7080 at 1 2 6
10
11 5 0×8
10
112 10 0
10
1125 0 0
7
7875 0 0
90 0 0
Facit 7965 0 0

(6) *L. s. d.*
286573 at 4 3 9×3
10
41 17 6×7
10
418 15 0×5
10
4187 10 0×6
10
41875 0 0×8
10
418750 0 0
2
837500 0 0
335000 0 0
25125 0 0
2093 5 0
293 2 6
12 11 3
Facit 1200024 8 9

Application.

EXAMPLES.

(1)

	L.	*s.*	*d.*
	1	11	5
			×9
ans.	14	2	9

(2)

	s.	*d.*
	9	6
		12
L.	5	14	0

(3)

	L.	*s.*	*d.*
	1	14	6
			6×7=42
	10	7	0
			7
L.	72	9	0

(4)

	s.	*d.*
	18	11½
		9
	8	10	7½
			11
L.	9	16	10½

(5)

	s.	*d.*
	13	4
		12×12=144
	8	0	0
			12
L.	96	0	0

(6)

	s.	*d.*
	7	10×1
		6×10−1=59
	2	7	0
			10
	23	10	0
—	0	7	10
L.	23	2	2

(7)

	L.	*s.*	*d.*
	1	2	3×7
			10×11+7
	11	2	6
			11
	122	7	6
+	7	15	9
L.	130	3	3

(8)

	s.	*d.*
	6	8×8
		10
	3	6	8×9
			10
	33	6	8
	30	0	0
	2	13	4
L.	66	0	0

(9)

	L.	*s.*	*d.*
	1	2	6×5
			10
	11	5	0×7
			10
	112	10	0
			2
	225	0	0
	78	15	0
	5	12	6
L.	309	7	6

(10)

	s.	*d.*
	2	5
		10
	1	4	2
			10
	12	1	8
			3
	36	5	0
	3	12	6
	0	14	6
L.	40	12	0

(11)

	s.	d.	
	0	1¼	
		10	
	9	9½	×5
		10	
4	17	11	
		3	
14	13	9	
2	8	11½	
L. 17	2	8½	

(12)

	L.	s.	d.	
	3	8	11¼	×9
			10	
	34	9	4½	×3
			10	
	344	13	9	
			7	
	2412	16	3	
	103	8	1½	
	31	0	5¼	
L.	2547	4	9¾	

(13)

	s.	d.	
	15	3	
			4×6=24
3	1	0	
		6	
L. 18	6	0	

(14)

	s.	d.	
	5	6	
			9×11−1=98
2	9	6	
		11	
27	4	6	
0	5	6	
L. 26	19	0	

(15)

	s.	d.	
	0	7½	×2
		10	
	6	3	×7
		10	
3	2	6	
		6	
18	15	0	
2	3	9	
0	1	3	
L. 21	0	0	

(16)

	s.	d.	
	14	6	
		10	
7	5	0	×4
		10	
72	10	0	
		2	
145	0	0	
29	0	0	
L. 174	0	0	

(17)

	L.	s.	d.	
	1	12	6	×5
			10	
	16	5	0	×6
			10	
	162	10	0	
			3	
	487	10	0	

then

487	10	0	
97	10	0	
8	2	6	
593	2	6	
294	12	6	
L. 887	15	0	

(18)

	d.	*s.*	*d.*
18 =	1	6	×4
		10	
	15	0	×4
		10	
	7	10	0 ×3
		10	
	75	0	0
	22	10	0
	3	0	0
	0	6	0
L.	100	16	0

(19)

	s.	*d.*
	7	6 ×5
	10	
3	15	0 ×6
	10	
37	10	0
	3	
112	10	0
22	10	0
1	17	6
L. 136	17	6

(20)

w. d.	*d.*	*s.*	*d.*
52 ×6 + 1 =	313 at	2	6 ×3
		10	
	1	5	0 ×1
		10	
	12	10	0
		3	
	37	10	0
	1	5	0
	0	7	6
L.	39	2	6

(21)

	s.	*d.*
	12	6
		10
6	5	0
		10
62	10	0
		10
answer *L.*	625	0 0

(22)

	s.	*d.*
	19	11 ×5
	10	
9	19	2 ×6
	10	
99	11	8
	3	
298	15	0
59	15	0
4	19	7
L. 363	9	7

	L.	*s.*	*d.*
From	500	0	0
Take	363	9	7
Lays up	135	10	5

Note. The answer to the 23d and such like questions, may be more concisely obtained, by deducting the prime cost of 1 lb. &c. from the selling price, and multiplying the remainder by the quantity: the product will be the gain on the whole.

(23)

	s.	*d.*	
504×6=3024 at	0	8½	×4
		10	
	7	1	×2
		10	
	3	10	10
		10	
	35	8	4
			3
	106	5	0
		14	2
		2	10
Bought for	107	2	6

	s.	*d.*	
again 3024 at	0	9½	×4
		10	
	7	8½	×2
		10	
	3	17	1
		10	
	38	10	10
			3
	115	12	6
	0	15	5
	0	3	1
Sold for	116	11	0

	L.	*s.*	*d.*
From	116	11	0
Take	107	2	0
gained	9	9	0

(24)

	s.	*d.*	
30×25=500 at	2	7½	
		10	
	1	6	3
		10	
	13	2	6
			5
Prime cost	65	12	6

	s.	*d.*	
500 at	2	10½	
		10	
	1	8	9
		10	
	14	7	6
			5
Sold for *L.*	71	17	6
	— 65	12	6
Gained	6	5	0

COMPOUND DIVISION.

EXAMPLES.

(1) *L.* 36 18 8

(2) *L.* 3288 19 11¾

(3) *L.* 1921 8 5

(4) *L.* 1951 19 3¾

(5) lb.oz.dwt.gr.
8 4 15 14

(6) T.C.qr.lb.
15 6 0 13⅜

(7) lb. ℥ ʒ ℈ gr.
1 4 7 2 8⅞

(8) Deg.M.fur.P.
5 13 4 39⅛

(9) Y.ft.in.b.c.
2 0 3 1⅝

(10) Yds.qr.na.
6 3 0$\frac{6}{10}$

(11) A. R.P.
162 1 32$\frac{1}{11}$

(12) T.hhd.gal.qt.
2 1 17 3$\frac{2}{15}$

(13) Bu.P.qt. 39 2 $7\frac{10}{12}$ (14) Y.m.w.d. 299 8 1 $6\frac{5}{6}$ (15) D.hr.min.sec. 1 17 53 5

(16) *Sig.* ° ′ ″ 1 13 51 7

CASE 1.

EXAMPLES.

(2) *L. s. d.* 5)1 8 4 — Quoti. 0 5 8

(3) *L. s. d.* 7)3 19 $9\frac{1}{4}$ — 0 11 $4\frac{3}{4}$

(4) *L. s. d.* 9)4 8 6 — 0 9 10

(5) *L. s. d.* 10)3 15 0 — 0 7 6

(6) *L. s. d.* 11)9 17 $9\frac{1}{4}$ — 0 17 $11\frac{3}{4}$

(7) *L. s. d.* 6)11 11 3 — 1 18 $6\frac{1}{2}$

(8) *L. s. d.* 12)23 2 6 — Facit 1 18 $6\frac{1}{2}$

CASE 2.

(2) *L. s. d.* 3)3 10 $10\frac{1}{2}$ — 9)1 3 $7\frac{1}{2}$ — 0 2 $7\frac{1}{2}$

(3) *L. s. d.* 7)52 10 0 — 8) 7 10 0 — 0 18 9

(4) *L. s. d.* 8)372 16 0 — 12) 46 12 0 — 3 17 8

(5) *L. s. d.* 10)225 0 0 — 12) 22 10 0 — 1 17 6

(6) *L. s. d.* 8)474 0 0 — 9) 59 5 0 — 6 11 8

(7) *L. s. d.* 12)948 0 0 — 12) 79 0 0 — 6 11 8

CASE 3.

(2) *L. s. d.* 38)6 6 8(0 3 4

20

38)126

114

12

12

38)152

152

(3) *L. s. d.* 74)46 17 4(0 12 8

20

74)937

74

197

148

49

12

74)592

592

(4) *L. s. d.*

95)189 14 0(1*l.* 19 11
95
94
20
95)1894
95
944
855
89
12
95)1068
95
118
95
remains 23

(5) *L. s. d.*

106)310 12 0½(2*l.* 18 7½
212
98
20
106)1972(18*s.*
106
912
848
64
12
106)768(7*d.*
742
26
4
106)106(¼
106

(6) *L. s. d.*

654)3236 12 4½(4 18 11¾
2616
620
20
654)12412(18*s.*
654
5872
5232
640
12
654)7684(11*d.*
654
1144
654
490
4
654)1962(3qrs.
1[illegible]

Application.

(1) *s.* *d.*
4)17 6
4 4½

(2) *L.* *s.* *d.*
8)3 11 8
0 8 11½

(3) *L.* *s.* *d.*
12)3 3 0
0 5 3

(4) *L.* *s.* *d.*
4)18 6 0
6) 4 11 6
0 15 3

(5) *L.* *s.* *d.*
6)17 13 6
7) 2 18 11
0 8 5

(6) *L.* *s.* *d.*
10)83 6 8
10) 8 6 8
0 16 8

(7) *L.* *s.* *d.*
58)2 5 11
20
45
12
58)551(9*d.*
522
29
4
58)116(2 qrs.
116
ans. 9*d.*½ per lb.

(8) *L.* *s.* *d.*
230)26 16 8
20
230)536(2*s.*
460
76
12
230)920(4*d.*
920
ans. 2*s.* 4*d.* per. Bu.

(9) *L.* *s.* *d.*
814)66 2 9
20
814)1322(1*s.*
814
508
12
814)6105(7*d.*
5698
407
4
814)1628(2 qrs.
1628
answer 1*s.* 7*d.*½

(10) *L.*
3540)7965(2*l.* 5*s.* each.
7080
885
20
3540)17700(5*s.*
17700

(11) *L.* *s.* *d.*
5×20=100 { 10)94 3 4
10) 9 8 4
answer 0 18 10

(12) *L.* *s.* *d.*
144 { 12)57 0 0
12) 4 15 0
answer 0 7 11

(13) *L.* *s.* *d.*
400)14 3 4
20
283
12
4,00)34,00
answer 8*d.*½

(14)

L.	*s.*	*d.*		*L.*	*s.*	*d.*	
173	13	9 ÷4=		43	8	5¼	A.
147	11	4 ÷2=		73	15	8	B.
128	9	11 ×3 ÷4=		96	7	5¼	C.
		Sum left		213	11	6¼	answer

(15)

	L.	*s.*	*d.*	
From	1000	0	0	
1000 ÷3=	333	6	8	Wife's legacy.
1000 ÷4=	250	0	0	Eldest Son's do.
Take	583	6	8	
	2)416	13	4	
answer	208	6	8	each of the other Son's.

REDUCTION.

EXAMPLES.

(3) $\frac{1}{10}$85 cts. — 8½ answer 76½*d.*

(5) ⅓73*d.* + 8½ answer 81⅓

(6) 742 dols. ×1000m.=1 dol. answer 742000 mills.

(7) 1,0)7546,0m. 1,00)75,46 cts. ans. 75d.46 cts.

(8) dimes.m. 149,33=1 doub. × 12 Fac. 1791d.96 m.

(9) D.cts. 4,44=1*L.* × 100 Facit. 44*L*.4d.00 ct.

(10) 460cts.=1 Guin. ,50 23000 Facit.

(11)

L.	*s.*	*d.*
2691	13	2
	20	
	53833	
	12	
Facit	645998*d.*	

(12) 12)87600 2,0)730,0 Facit 365 *L.*

(13) 12)322999 2,0)2691,6 7*d.* Facit *L.* 1345 16 7

(14) *L. s. d.*
916 10 9¾
20
18330 *s.*
12
219969 *d.*
4
ans. 879879 qrs.

(15) *L. s. d.*
77 14 7½
20
1554 *s.*
12
18655 *d.*
2
ans. 37311 half *d.*

(16) Qrs.
4)879879
12)219969¾
2,0) 1833,0 9*d.*
ans. *L.* 916 10 9¾

(17) 2)37311 half *d.*
12)18655½
2,0)155,4 7*d.*
ans. 77 14 7½

(18) 1678dols.
15 six *d.* = 1d.
Facit 25170 six *d.*

(19) 728 dols.
90*d.* = 1d.
65520 *d.*
4
ans. 262080 qrs.

(20) 4)262080 qrs. then 728
9,0) 6552,0 *d.* 3
728 dols. 8)2184
ans. 273*l.*

(21) D. c. m.
4, 66 2 = 1 Guinea.
85
23310
37296
answer 396, 27 cts.

(22)
450 Moidores,
6 dols. = 1 Moidore
answer 2700 dols.

(23) *L. s. d.*
137 15 6¾
20
2755
12
33066
4
4)132267 qrs. Facit.
12)33066¾
2,0)275,5 6*d.*
Proof 137 15 6¾

(24) *L. s d.*
275 11 1½
20
5511
12
66133
2
2)132267 half *d.* Facit.
12)66133½
2,0)5511,1 1*d.*
Proof 275 1 1½

(25) 5)630

ans. 126 dols.

(26) 728 dols.
3
8)2184
ans. 273*l.*

(27) 546*l.*
8
3)4368
ans. 1456 dols.

(28) 537 dols.
3
8)1611
ans. *L.* 201 7 6

(29) 402*l.* 15
8 +6
3)3222
answer 1074 dols.

(30) *L.* *s.* *d.*
697 2 6
20
13942
12
1Cr.=99*d.*)167310(1690 ans.
99
683
594
891
891
0

or thus *L.* *s.* *d.*
697 2 6
8
3)5577
11)1859 dols.
— 169
answer 1690 Cr.

(31) 845 French Cr.
99
7605
7605
12)83655 *d.*
2,0)697,1 3
answer *L.* 348 11 3

(32) $\frac{1}{11}$)891 dols.
— 81
answer 810 Fren. Cr.

(33) $\frac{1}{10}$)1620 Fren. Cr.
+ 162
answer 1782 dols.

(34) 2,0)678 Eng. guin.
+ 33 18
L. 711 18 Sterl.
again 678
7
4)4746
answer 1186 10 currency.

(35) six pences *L.* *s.*
A Crown=10)279 13
½ Crown= 5 20
Shilling = 2 5593
— 2
17)11186(658of
102 each
98
85
136
136

(36) ½)461*l.* N. York. or thus 461 (37) 1685*l.*
2½ dols.=1*l.* 5 2
922 2)2305 5)3370
+230½
ans. 1152½ 1152½ ans. 674*l.* N. Caro.

(38) 112*l.* (39) 1620 dols. (40) 138*l.*
30 7 10
7)3360 3,0)1134,0 3)1380
ans. 480 dols. Facit 378*l.* answer 460 dols.

(42) D.cts. D.cts. D. cts.
(41) 436 dols. 4,44=1*l.* (43) 1*l.*=444)2664,00(600*l.*
3 25 2664
1,0)130,8 2220 00
L. 130 16*s.* 888
D. 111,00 cts.

(44) 185 dols. (45) ½)3550 livers.
m. 1000 mills=1 D. 18½ cts=1 livre.
livre=185)185000(1000 livres. 28400
185 3550
000 1775
dols. 656,75 cts.

(46) 780 dols.
100
1 guilder=39cts.)78000(2000 g. (47) 3475 guilders.
78 39 cts.=guilder.
000 31275
10425
dols. 1355,25

(48) D.c.m.
1 French pistole=3,66,7 (49) 500 Spanish pistoles.
246 7
22002 5)3500
14668
7334 Facit 700*l.*
answer 902,08,2 m.

(50) 180 English guin.
7
4)1260
ans. 315*l.*

(51) 350 Moidores.
9
4)3150
ans. 787 10*s.*

(52) 120 Doubloons
66 *s.* = 1 Doubloon
720
720
2,0)792,0
answer 396*l.* Sterling

again 120
5
8)600
+75
answer 675*l.* currency.

(53) 1240 Moidores.
9
7)11160
ans. 1594G.&6*s.*

again 1240
9
4)11160
2790*l.* currency

(54) 1320
2
3)2640
ans. 880*l.*

TROY WEIGHT.

(1) 37lb.
12
444 oz.
20
8880 dwt.
24
35520
17760
ans. 213120 grs.

(2) 24 = 4)213120 grains.
6) 53280
2,0) 888,0
12)444
answer 37 lbs.

(3) lb.dwt.gr.
59 13 5
12
708
20
14173
24
56697
28346
340157 grains.

(4) lb.oz.dwt.
4 7 2
12
55
20
1102
24
4408
2204
26448 = grains in 1 ingot.
4
answer 105792 do. in 4 do.

(5) lb. oz. dwt.
9 7 10
12
oz. dwt.
5 10 115
20 20
11,0) 2310
answer 21 spoons.

(6) dwt.
10 = ½oz.
24
24,0) 456,0 (19 answer.
24
216
216

(7) lbs. oz. dwt. gr. lbs. oz. dwt.
2 1 15 0 × 12 = 25 9 0
1 3 15 22 × 12 = 15 9 11
answer lbs. 41 6 11

(8) lb. oz.
19 3
12
11) 231
ans. 21 porringers

AVOIRDUPOIS WEIGHT.

EXAMPLES.

(1) 15 Tons
20
300 Cwt.
4
1200 qrs.
28
9600
2407
ans. 33600 lbs.

(2) 28 = 4)67200
7)16800
4)2400
2,0)60,0C.
ans. 30 T.

(3) C. qr. lb.
9 0 5
4
36
28
293
72
1013
16
ans. 16208oz.

(4) Drams.
16 = 4)20571005
4) 5142751 1
16 = 4) 1285687 13 dr.
4) 321421 3
28 = 4) 80355 7oz.
7) 20088 3
4) 2869 23lb.
2,0) 71,7 1qr.
Tons 35 17 1 23 7 13

(5) C. qr. lb.
2 2 11
6
15 2 10
4
62
28
496
125
answer 1746 lbs.

(6) 235 Parcels.

52

470

1175

28 = 4)12220
7) 3055
4) 436 12 lb.

answer C. 109 0 12 lb.

(7) C. qr. lb.
17 1 6

4

69

28

558

138

34)1938(57 Parcels.
170

238

238

(8) 12)3492 lbs.

28 = 4)291
7) 72 3
4) 10 11 lb.

C. 2 2 11

APOTHECARIES WEIGHT.

EXAMPLES.

(1) 17 lbs.
12

204 oz.
8

1632 dr.
3

answer 4896 scru.

(2) 2,0)133200,5 grs.
3) 66600 5
8)22200
12)2775

answer 231lb. 3dr. 5gr.

(3) 5 lb.
12

60
8

16 = 4)480
4)120

answer 30 parcels

(4) 24 drams.
20 parcels.

8)480

12) 60

answer 5 lb.

LONG MEASURE.

EXAMPLES.

(1)

273 miles.
8
2184
40
½) 87360
5½
436800
43680
480480
3
1441440
12
answer 17297280 inches.

(2)

12)34594560
3) 2882880
960960
2
11)1921920
4,0)17472,0
8)4368
ans. 546 miles.

(3)

M.fur.P.yds.ft in.
2 1 8 3 0 2
8
17
40
½) 688
5½
3443
344
3787
3
11361
12
ans. 136334 inches.

(4)

b.c.
3)2280060
12)760020
3)63335
21111 2 feet.
2
11) 42222
4,0) 383,8 2yd.
8) 95 38 P.
answer 11m.7f.38p.2y.2f.

(5)

150 miles.
8
1200
40
½)48000
5½
240000
24000
264000

ft. in.
18 4
12
22,0

264000
3
792000
12
2)9504000
11)4752000
answer 43200

(6)

Revolutions.
ft. in. 86400
18 4×12=220 in.
1728000
1728
12)19008000
3) 1584000
528000
2
11)1056000
4,0)9600,0
8)2400
answer 300 miles.

(7)

½)360 degrees.
69½
3240
2160
180
25020
8
200160×40
½)8006400
5½
40032000
4003200
ans. 44035200 yards.

CLOTH MEASURE.

EXAMPLES.

(1)

Yds.qr.na.
15 3 1
4
63
4
answer 253

(2)

na.
4)1012
4)253
answer 63yds.1qr.

(3)

E.F.
73
3
ans. 219 qrs.

(4)

na.
4)1752
3)438
answer. 146 E.F.

(5)

na.
4)1408
5) 352
answer 70 E.E. 2qr.

(6)

Bales.
10
10
100
12
ans. 1200 yds.

(7)

Yds.qr.
408 3
4
3)1635
545 E.F.
3
5)1635
answer 327 E.E.

(8) Bales.
4
12
48 pieces.
24
192
96
1152 E.E.

then 1152 E.E.
5
4)5760
1440 yds.
4
3)5760
ans. 1920 E.F.

LAND MEASURE.

EXAMPLES.

(1) A. R. P.
27 1 32
4
109
40
answer 4392 perches.

(2) Perches.
4,0)439,2
4)109 32 P.
answer 27A.1R.32P.

(3) A. R. P.
1st Field 6 2 36
2d do. 10 0 0
3d do. 12 1 0
28 3 36
4
115
40
76)4636(61 shares.
456
76
76

(4) Perches.
25 = 5)1299600
5)259920
4,0)5198,4 = Per. in each.
4)1299 24P.
answer 324A.3R.24P.

LIQUID MEASURE.

EXAMPLES.

(1) 19 hhds.
63
57
114
1197 gals.
4
4788 qts.
2
9576 pints.

(2) 2)19152 pints.
4)9576 qts.
63 = 7)2394 gal.
9)342
answer 38 hhds.

(3) 11 Bar.
1 Bar. = 31½ gal.

11
33
05 2qt.
346 2
4
answer 1386 quarts.

(4) 165 gal.
a gallon = 8 pts. 4
a quart = 2 660
a pint = 1 2
division 11)1,320 pints.
12) 120
answer 10 doz.

DRY MEASURE.

EXAMPLES.

(1) Bu.P.qt.
17 0 5
4
68
8
549 qts.
2
answer 1098 pints.

(2) Pts.
2)5054
8)2527
4) 315 7qts.
answer 78bu.3p.7qts.

(3) One granary contains Bu. P. qt.
65 1 6
4
Bu.P.
5 2 261 3 0
4 4
22)1047(47 Sacks.
88
167
154
13 pecks over, = 3bu. 1p.

TIME.

EXAMPLES.

(1) w. d.
37 5
7
264
24
1056
528
6336

6336
60
answer 380160 min.

(2) seconds.
6,0)2479680,0
6,0) 41328,0
24 = { 4)6888 / 6)1722 / 7) 287
answer 41 weeks.

(3) D. hr.
A Year = 363 6
24
1466
730
8766 hours.
60
525960 min.
60
answer 31557600 sec.

(4) 4004 Years.
1790
¼)5794
365¼
28970
34764
17382
1448¾ day = 12 hours.
answer 2116258D.12hr.

MOTION.

EXAMPLES.

(1) 6 sig.
30
180
60
answer 10800 min.

(2) A revolution = 360 deg.
60
21600
60
answer 1296000 sec.

Application.

(1) 4)400
100
3
8)300
Facit *L.* 37 10

(2) A mark = ⅜ *L.*
therefore mul. *L.* 496 13 4
by 3+2
2)1490
answer 745 marks.

(3) 1260 Moid.
9
7)11340
answer 1620 Eng. guineas.

(4)
s. d.
4 7
12
s. d.
5 6½
12
66
2
133

52
2
110
×476
)52360

then 133)52360(393 Duca.
399
1246
1197
490
399
remains 91½*d.*=3*s.*9*d.*½over

(5)
L. *s.* *d.*
6 17 3½
20
137
12
1647
2
3295

L. *s.* *d.*
123 11 3
20
2471
12
29655
2
59310

then 3295)59310(18 ans.
3295
26360
26360

(6) 36 oz.
8
12)288
answer 24 plates.

(7)
Gallons.
Pipes 250×126 =31500
Hhds. 130× 63 = 8190
half do. 150× 31½= 4725
44415 gals. in all.
8=pints in 1 gal.
28= 4)355320 lbs.
7) 88830
4) 12690
2,0) 317,2 2qrs.
Facit 158T.12.C.2qr.

(8) C. qr. lb.
2 1 14
4
9
28
266
28
7448

(9) C. qr. lb.
4 3 24
2
9 3 20
6 9
8 9
12 9
16 104
42)1112(26 of each,
84 and 20lb. over
272
252
rem. 20 lb.

(11) C. qr.
7 2
7
7
756
840 lbs. in 1 hhd.
2
24)1680 70 boxes.
168
0

then 38)7448(196 canisters
38
364
342
228
228

(10) Deg.
½(360
69½
3240
2160
180
25020 miles.
8
200160 fur.
40
½)8006400 per.
5½
40032000
4003200
44035200 yds.
3
132105600 ft.
12
1585267200 in.
3
4755801600 b.c. ans.

(12) C. qr. lb.
12 1 10
4
49
25
245
99
1235 lbs in 1 hhd.
56
7410
6175
69160

then 112)69160(617 2 ans.
672
196
112
840
784
56 lbs = 2 qrs.

(13) 46 Bales.
24
184
92
1104 pieces.
42
2208
4416
46368 E.Fl.

then 46368
3
4)139104
answer 34776 yards.

(14) M.fur.yds.
7 1 94
8
57
40
2)2280
5½
11400
1140
94
12634
3
ft.in.b.c.
2 8 2 37902
12 12
32 454824
3 3
98)1364472

98) then 1364472(13923 steps.
98
384
294
904
882
227
196
312
294
remains 18

(15) ft.in.b.c. 12898 then 7983862
17 2 1 = 619 b.c. 760320
116082 380662
12898 380160
77388 502 remain.

B.c. in a M. 190080)7983862(42

(16) Years. then 2116258
4004 24
1790 8465034
¼)5794 4232517
365¼ 50790204
28970 60
34764 3047412240
17382 60
1448 2/4 = 12 hr. ans. 182844734400 sec.
2116258 12 hr.

(17) Y. qr. na. then 86
2 3 0 × 450
1 1 0 430
1 1 2 344
5 1 2 4)38700
4 4) 9675
21
4 answer 2418yd. 3qrs.
86

(18) lbs. oz.dwt.gr. then dwt.gr.
3 5 16 2 5 7
12 24
41 127)20066(158 rings.
20 127
836 736
24 635
3346 1016
1672 1016
20066

THE SINGLE RULE OF THREE.

EXAMPLES.

(2) Stated thus. As 8yd. : 3D. 20c. : : 96yd. : 38D. 40c.
For 3,20×96=307,20 which÷8=38,40 answer.

(3) Stated thus: 3D. 20ct. : 8yd. : : 38D. 40ct. : 96yd.
For 38,40×8=307,20 which ÷3,20=96yd. answer.

(4) Thus: As $7\frac{3}{8}$ yd. : 44 *L.* 16 *s.* : : $\frac{8}{1}$ yd.
1
See the note. 8)44 16
answer *L.* 5 12*s.*

(5) Thus, As 96 lb. : 9,60 D. ct. : : 1 lb.
1
96)9,60),10ct. ans.
96
0

lb. *d.* lbs. *L. s. d.* *d. L. s. d.*

(6) As 1 : 8 : : 112 : 3 14 8 ans. For 112×8=896=3 14 8

(7) Thus: As 1lb. : 15*d.* : : 112lb. : 7*l.* For 112lb.×15*d.* =1780*d.* and 1780*d.*÷12 and by 20=7*l.* answer.

gal. *d.* gal. qts. *d.* qts. *L. s.*

(8) Thus: As 1 : 16 : : $31\frac{1}{2}$ Or, As 4 : 16 : : 126 : 2 2
For 126×16=2016 which ÷4=504*d.* and 504÷12 and by 20=2*l.* 2*s.* answer.

(9) 19×12=228 pair; then as 228pr. : 136,80ct. : : 1pr. : 60ct. For 136,80÷228=,60cts. answer.

(10) 3C.=336lb. then As 1lb. : 20ct. : : 336lb. : 67D.20ct.
For 336×20=67D. 20ct. answer.

(11) Thus: As 1C. : 1*l.* 8*s* : : 33C. 1qr. 22lb. Or, as 112lb. : 28*s.* : : 3746lb. : $932\frac{8\,6}{1\,1\,2}$*s.* For 3746×28= 104888 which÷112=932$\frac{1}{2}$*s.* or 46*l.* 12*s.* 6*d.* answer.

(12) 12pcs.×12yd.=144yd, Then as 1yd : 1,40c. : : 144yd. : 201,60ct. For 144×1,40=201D. 60ct. answer.

(13) Thus: As 30oz. 10dwt. : 9*l.* 2*s.* 6*d.* : : 1 oz. Or, As 730dwt. : 2190*d.* : : 20dwt. : 60*d.* For 2190×20= 43800 which÷730=60*d.* or 5*s.* answer.

(14) Thus: As 1D. : 70ct. : : 1000D. : 700D. For, 1000×,70=700D. answer.

(15) Thus: As 17C. 3qr. 17lb. : 133*l.* 13*s.* 4*d.* : : 1oz. : 1*d.* or, As 32080 oz. : 32080*d.* : : 1 oz. : 1D. answer.

(16) Thus: As 26*s.* 8*d.* : 1C. : : 23*l.* 10*s.* Or, as 320*d.* : 1C : : 5610*d.* : 17C. 2qr. 14lb. For 5640÷320= $17\frac{2\,0}{3\,2}$C.=17C. 2qr. 14lb. answer.

(17) Thus : As 90lb. : 18*l.* : : 518lb. : 103*l.* 12*s.* For 518 × 18 = 9324 which ÷ 90 = 103*l.* 12*s.* whole cost. And as 90lb. : 18*l.* : : 1*l.* : 4*s.* per lb. answer.

$$\frac{20}{36,0 \div 90 = 4s.}$$

(18) 17T. 12C. = 352, then as 352C. : 440D.00 : : 2C. : 2D. 50ct. For 440,00 × 2 = 880,00 which ÷ 352 = 2D. 50ct. answer.

(19) Thus : As 1day : 2D. 40ct. : : 365 : 876D. For 365 × 2,40 = 876D. answer.

(20) First 546lb. × 14 bags, = 7644lb. and 48 guin. × 35*s.* = 1680*s.* and 1C. = 112lb ; then, As 7644lb. : 1680*s.* : : 112lb. : 24*s.* $\frac{704}{7644}$, For 1680 × 112 = 188160 which ÷ 7644 = 24$\frac{704}{7644}$*s.* or 1*l.* 4*s.* 7*d.*$\frac{1}{4}$+ answer.

(21) 58 + 62 + 65$\frac{1}{2}$ = 185$\frac{1}{2}$ gal. in 3 casks, then, as 1 gal. : 89c. : : 185$\frac{1}{2}$ gal. Or, as 4qts. : 89c. : : 742qts. : 165D. 09ct. 5m. For 742 ×,89 = 660,38 which ÷ 4 = 165D. 9ct. 5m. answer.

(22) 23 + 24 + 25 + 27 = 99 yards in the 4 pieces. Then, as 1yd. : 72ct. : : 99 : 71D. 28ct. For 99 ×,72 = 71D. 28ct. answer.

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(23) 26$\frac{1}{2}$ × 2 + 23$\frac{3}{4}$ × 2 = 100$\frac{1}{2}$ yards, or 402 qrs. Thus : as 4 qrs. : 44ct. : : 402 qrs. : 44D. 22ct ; For 402 ×,44 = 176,88 which ÷ 4 = 44D. 22ct. answer.

(24) 21*s.* 4*d.* = 256*d.* then as 1yd : 256*d.* : : 86yd. : 22016*d.* 254*l.* 10*s.* = 61080*d.* and 61080*d.* — 22016 = 39064*d.* also, 242 — 86 = 156yds. then as 156yds. : 39064*d.* : : 1yd. : 250*d.*$\frac{1}{2}$; For 39064 ÷ 156 = 250$\frac{1}{2}$*d.* Or, 20*s.* 10*d.* $\frac{1}{2}$qrs. answer.

L. 162 15*s* 4*d.* = 39064*d.* Now say, as 156yds. : 39064*d.* : : 1yd. : 250$\frac{1}{2}$*d.* For, 39064 ÷ 156 = 250$\frac{1}{2}$*d.* = 20*s.* 10*d.*$\frac{1}{2}$+ per yd. answer.

(25) Thus : As 1yd. : 7*s.* 9*d.*$\frac{1}{2}$: : 53E.e. 1qr. Or, as 4qrs. : 374qrs. : : 266qrs. : 24871qrs. For 266 × 374 = 99484 which ÷ 4 = 24871qrs. or 25*l* 18*s* 1$\frac{1}{2}$*d.* ans.

(26) Thus : As 159*l* 2*s.* : 43C. 2qrs. : : 26*l* 10*s* 4*d.* Or, as 38184*d.* : 174qrs. : : 6364*d.* : 29qrs. For 6364 × 174qrs. = 1107336 which ÷ 38184 = 29qrs. or 7C. 1qr. ans.

(27) Thus : As 977*l.* : 420*l.* 6*s* 3*d*$\frac{1}{4}$. : : 1*l.* Or, as 977*l.* : 403501qrs. : : 1*l.* : 413qrs. For 403501 ÷ 977 = 413qrs. = 8*s* 7*d.*$\frac{1}{4}$ answer.

(28) Thus : As 1 oz. : 5*s* 9*d*. :: 73lb. 5 oz. 15dwt. Or, as 20dwt. : 69*d*. :: 17635dwt. : 60840*d*. $\frac{3}{4}$ For 17635 × 69 = 1216815 which ÷ 20 = 60840*d*. $\frac{3}{4}$ = 253*l* 10*s* 0*d*. $\frac{3}{4}$ answer.

(29) Thus : As 1C. : 2*l* 6*s* 6*d*. :: 3C. 1qr. 7lb. × 3. Or, as 112lbs. : 558*d*. :: 1113lbs. : 5545*d*. $\frac{14}{112}$ For 1113 × 558 = 621054 which ÷ 112 = 5545 $\frac{1}{8}$*d*. or 23*l* 2*s* 1*d*. $\frac{1}{8}$ answer.

(30) Thus; As 1*l*. : 3*s* 6*d*. :: 763*l* 15*s*. Or, as 20*s*. : 42*d*. :: 15275*s*. : 32077*d*. $\frac{1}{2}$. For 15275 × 42 = 641550 which ÷ 20 = 32077 $\frac{10}{20}$*d*. or 133*l* 13*s* 1 $\frac{1}{2}$*d*. ans.

(31) Thus : As 7*s* 9*d*. $\frac{1}{2}$: 1yd. :: 25*l* 18*s* 1*d*. $\frac{3}{4}$ Or, as 374qrs. : 4qrs. :: 24871qrs. : 266qrs. For 24871 × 4 = 99484 which ÷ 374 = 266qrs. ÷ 5 = 53 E.e. 1qr. ans.

(32) Thus : As 1yd. : 18*s*. 6*d*. :: 1qr. 1na. Or, as 16na. : 222*d*. :: 5na. : 69 $\frac{6}{16}$*d*. For 222 × 5 = 1110 which ÷ 16 = 69 $\frac{6}{8}$*d*. or 5*s* 9*d*. $\frac{3}{8}$ answer.

(33) Thus : As 8*s* 7*d*. $\frac{1}{2}$: 1*l*. :: 420*l* 6*s* 3*d*. $\frac{1}{4}$ Or, As 413qrs. : 1*l*. :: 403501qrs. : 977*l*. answer.

(34) Thus : As 1 oz. : 6*s* 4*d*. :: 1lb. 7 oz. 14dwt. Or, As 20dwt. : 76*d*. :: 394dwt. : 1497*d*. $\frac{4}{20}$ For 394 × 76 = 29944 which ÷ 20 = 1497 $\frac{4}{20}$*d*. or 6*l* 4*s* 9*d*. $\frac{1}{5}$ answer.

(35) Thus : As 1C. : 2*l* 19*s* 8*d*. :: 2C. 1qr. 14lb. × 7 casks. Or, as 112lbs. : 716*d*. :: 1862*l*. : 11903 $\frac{1}{2}$*d*. For 1862 × 716 = 1333192 which ÷ 112 = 11903 $\frac{1}{2}$*d*. or 49*l* 11*s* 11*d*. $\frac{1}{2}$ answer.

(36) Thus : As 1A. : 1*l* 7*s* 8*d*. :: 173A. 2R. 14P. Or, As 160P. : 332*d*. :: 27774P. : 57631*d*. $\frac{6}{160}$. For 27774 × 332 = 9220968 which ÷ 160 = 57631*d*. $\frac{1}{2\frac{6}{0}}$, or 240*l* 2*s* 7*d*. $\frac{1}{2\frac{6}{0}}$ answer.

(37) Thus : As 5yds. : 14*s* 2*d*. :: 21yds. 1qr × 9pcs. Or, as 20qrs : 170*d*. :: 765qrs. : 6502*d*. $\frac{10}{20}$, For 765 × 170 = 130050 which ÷ 20 = 6502 $\frac{1}{2}$*d*. or 27*l* 1*s* 10 $\frac{1}{2}$*d*. ans.

(38) First, 3858,24ct—1200D = 2658,24ct. to be expended yearly : Then, as 365days. : 2658,24ct. :: 1day : 7,28 + For 2658,24 ÷ 365 = 7D.28ct. + answer.

(39) Thus : As 1day : 2D 14ct. :: 365days : 781,10ct. For 365 × 2,14 = 781D. 10ct. he spends yearly. Then 1333—781,10 = 551D. 90ct. saves yearly.

(40) Thus : As 7ft. : 4ft. :: 198ft.

4

792 ÷ 7 = 113 $\frac{1}{7}$ feet, answer.

(41) Thus: As 24 hr. : 360 Deg. × 69½ M. :: 1 min. Or, As 1440 min. : 25020 M. :: 1 min. : 17⅜ M. For 25020÷1440=17M. 3fur. answer.

(42) 53+94+40+27=214ct. will buy 1 lb. of each. Then, as 214ct : 1lb. : : 149800cts. : 700lb. of each. For 149800÷214=700lb. answer.

(43) Thus : As 14lb. 3 oz. 8dwt. : 1371,20ct. :: 1 oz. Or, as 3428dwt. : 1371,20ct. : : 20dwt. : 8D. For 1371,20 × 20=27424 which÷3428=8dols. answer.

(44) 1,66+1,97+2,31=5,94 will pay for 1 ream of each. Then, as 5,94ct. : 1 ream : : 528,66ct. : 89 reams; For 528,66÷5,94=89 reams of each sort. answer.

(45) Thus : As 9C. 3qrs : 27*l* 17*s* 6*d*. : : 2C. 1qr. 11lb. Or, as 1092lb : 6690*d*. : : 263lbs : 1611*d*.+ For 263 × 6690 = 1759470 which ÷ 1092=1611*d*. + Or. 6*l* 14*s* 3*d*. answer.

(46) Thus : As 1C. : 28*s* 7*d*. : : 59C. 1qr. 14lb. Or, as 112lb. : 343*d*. : : 6650lb. : 20365*d*.$\frac{3}{16}$ For 6650 × 343 =2280950 which÷112=84*l* 17*s* 1*d*.½+ answer.

(47) Thus : As 1A. : 9D. : : 476A. 3R. 28P. Or, as 160P. : 9D. : : 76308P. : 4292D. 32ct. 5m. For 76308 × 9 = 686772 which÷160=4292,32ct. 5m. ans.

INVERSE PROPORTION.

EXAMPLES.

(2) Thus: As 1½yd. : 7½yds. : : 3qrs. Or, as 6qrs. : 30qrs. : : 3qrs. : 60qrs. For 30×6=180 which ÷ 3=60qrs. or 15yds. answer.

(3) Thus : As 12days : 100men : : 3days
12

1200÷3=400 men. answer.

(4) Thus : As 12 in.leng. : 12 in.br. : : 4½ in.leng. Or, as 24half in. : 12 in : : 9half in. : 32 in. For 24 × 12 =288 which÷9=32 in. answer.

(5) Thus : As 1yd : 27ft × 20ft : : 2ft. 6 in Or, as 36 in. : 540ft. : : 30 in. : 648ft. For 540 × 36= 19440 which ÷30=648ft÷9=72yds. answer.

(6) Thus : 5qrs : 30yds :: 3qrs.
5

150÷3=50yds. answer.

(7) Thus : As 12m. : 100*l* : : 8m.

$$\frac{-}{3} \quad \frac{3}{-} \quad \frac{-}{2}$$

300÷2=150*l*. answer.

(8) Thus : As 4qrs. : 20yds.×4=80yds : : 5qrs.

$$\frac{4}{}$$

320÷5=64yds. answer.

(9) Thus : As 24days : 5 men : : 15 days : 8m.

$$\frac{5}{}$$

120÷15=8 men. answer.

(10) Thus : As 5 men : 24 days : : 8 men : 15 days

$$\frac{5}{}$$

120÷8=15 days. answer.

(11) Thus : As 4)16hr : 3days : : 4)12hr. : 4 days.

$$\frac{4}{} \quad \frac{4}{} \quad \frac{3}{}$$

12÷3=4 days. answer.

(12) Thus : As 6)6 men : 12 days : : 6) 24 men : 3 days

$$\frac{-}{1} \quad \frac{1}{-} \quad \frac{-}{4}$$

answer.

12÷4=3 days. answer.

(13) Thus : As 4p. : 40p. : : 8p. : 20p.

$$\frac{4}{}$$

160÷8=20 perches. answer.

(14) Thus : As 50,0*l*. : 6m. : : 22,0*l*. : $13\frac{7}{11}$m. For 50 ×6=300 which÷22=$13\frac{4}{11}$ months, or 13m.19d.+ans.

(15) Thus : As 4*s* 6*d*. : 12 oz. : : 3*s*. : 18 oz. Or, as 18)54*d*. : 12 oz. : : 18)36*d*. : 18 oz.

$$\frac{-}{3} \quad \frac{\times 3}{-} \quad \frac{-}{2}$$

36÷2=18 oz. answer.

(16) Thus : As 3qr. in : 208lbs : : 39 in.×4qrs=156qr. in. : 4lb.

$$\frac{\times\ 3}{}$$

624÷156=4lbs. answer.

(17) Thus : As 2 m. : 800 men : : 5 m.

$$\frac{2}{5)1600}$$

Then, 800—320=480 men depart.

(18) Thus : As 4qrs. : 18×30 : : 2qrs.

$$\frac{30}{540}$$

$$\frac{4}{2)2160}$$

ft.

(1080÷9=120yd. an

(19) Thus : As 40P. : 4P. :: 13½P.

2 2
80 27

4 P. yds. ft. in. b. c.

27)320(11 4 2 0 2 answer.

27

50

27

½)23

× 5½

115

+ 11½yd = 1ft. 6in,

27)126(4yds,

then 27)126(4 yds.

108

18 feet.

3 + 1 ft.

27)55(2 ft.

54

1

12 + 6 in.

18

3

27)54(2b. c.

54

(20) *s. d. oz.* *s. d.*

Thus : As 6 3 : 9 :: 8 2½

12 12

75 98

2 2

150 197

9

197)1350(6 oz. 13 dr. + answer.

1182

168

16

197)2688(13 dr.

then 197)2688(13dr.

197

718

591

remains 127

(21) Thus : As 8,0*l.* : 15yds. :: 60,0*l.*

8

6,0)12,0

answer 2 years.

Application.

(1) Thus : As 7*s* 3*d.* : 3qrs. :: 13*l* 15 6*d.* Or, as 87*d.* : 3qrs. :: 3306*d.* : 114qrs. For 3306 × 3 = 9918 which ÷ 87 = 114qrs. or, 28yds. 2qr. answer.

(2) Thus : As 9lbs. 9 oz. 12dwt. : 411*l* 12*s.* :: 1gr. Or, as 56448grs. : 98784*d.* :: 1gr. : 1*d.*¾ For 98784 ÷ 56448 = 1*d.*¾ answer.

(3) Thus inversely: As 250*l.* : 7mo. :: 300*l.* : $5\frac{5}{6}$mo. For 250×7=1750 which÷300=$5\frac{5}{6}$mo. or, 5mo. 25*d.* answer.

(4) Thus: As 1day: 19*s* 7*d*=235*d.* :: 365days: 85775*d.* For 365×235=85775*d.* which÷12 and by 20=357*l.* 7*s* 11*d.* Then 500 guin. ×21=10500*s.* which÷20=525*l.* and Lastly 525*l*—357*l* 7*s* 11*d*=167*l* 12*s* 1*d.* answer.

(5) Thus: As 1yd. : 13*s* 2*d.*½ :: 52E.E. 3qrs. Or, as 4qrs. : 634far. :: 263qrs. 41685 + farthings. For 263 ×634=166742 which ÷ 4 = 41685 qrs. or 43*l* 8*s* 5*d.*¼ answer.

(6) Thus inversely: As

11days : 30men×4 :: 12days.

4

120×11=1320÷12=110men. answer.

(7) Thus: As 1750*l.* : 32*l* 16*s* 3*d.* :: 1*l.*

20

656

12

7875÷1750=4.*d*½ answer.

(8) First 3 Tons=12 hhds.=756 gals. and 756—85 gals.= 671 gal. remain. Then say, as 671 gal. : 151*l* 14*s.*= 3034*s.* :: 1G. : 4*s* 6*d.*¼ + For 3034÷671=$4\frac{3}{671}$*s.*= 4*s* 6*d.*¼.

(9) Thus inversely: as 5C. 0qr. 14lb. : 96m. :: 3C. 1qr. Or, as 574lbs. : 96m. :: 364lbs. : $151\frac{40}{60}$ miles. For 574×96=55104 which÷364=151M. 3fur. 3P. +ans.

(10) Thus: As 200yds. : 90*l.*—7*l* 10*s.*=82*l* 10*s.* :: 1c.E. Or, as 800qrs. : 1650*s.* :: 5qrs. : $10\frac{5}{16}$*s.* For 1650 ×5=8250 which÷800=$10\frac{250}{800}$*s.* or, 10*s* 3*d.*¼ answer.

(11) Thus inversely: As 512m. : 225C. :: 64m. : 1800C. For 512×225=115200 which÷64=1800C.wt. answer.

(12) First 6*s* 6*d.*÷2=3*s* 3*d.* price per yd. And 3*s* 3*d.*×5 =16*s* 3*d.* value of 5 yds. Then, 18*s* 9*d.*—16*s* 3*d.*= 2*s* 6*d.*=30*d.* gained on 5yds. 180yds. at 3*s* 3*d*=29*l* 5*s.* or 7020*d.* Then lastly as 30*d.* : 5yds :: 7020*d.* : 1170 yds. answer.

(13) Thus: As 6ft. 4in. : 3ft. :: 633ft. 4in. : 300ft. or, As 76 in. : 1yd. :: 7600in : 100yds. For 7600÷76= 100yds. answer.

(14) Thus: As 12yds. : 8yds. :: 24 pcs. × 20yds. = 480 : 320yds. For 480×8=3840 which÷12=320 yds. ans.

(15) First 100*l*.—60*l*.=40*l*. value of the Serge. And as 2yds. Ser. : 3yd. Shal. :: 237yd. Ser. : 355½yd. Shal. Then, yds. *L*. yd.

As $\begin{cases} 355\frac{1}{2} : 60 :: 1 \\ 237 : 40 :: 1 \end{cases}$: 3*s* 4*d*.½ + answer.

(16) Thus: As 1*l* 7*s* 10*d*. : 4E.E. :: 118*l* 17*s* 7*d*.½ Or, as 668 half-pen. : 20qr. :: 57063 half-pen. : 1708qrs. 1na. + Then 2dly, as 33E.Fl. 1qr. 1na. : 1 piece :: 1708qrs. 1na. Or, as 402na. : 1piece :: 6833na. : 16 pieces and 401na. or 33E.Fl. 1qr. 1na. over. answer.

(17) Thus: As 5*s* 6*d*. : 1E.Fl. :: 352*l*. Or, as 66*d*. : 3qrs. :: 84480*d*. : 3840qrs. which÷4=960yds. in all. Again 3840qr. ÷ 5=768E.E. which ÷ 64=12E.E. in each piece. answer.

(18) Thus : As 50ft. 11in. : 98ft. 6in. :: 300ft. 8in. Or, As 611in. : 1182in :: 3608in. : 6979 in. + Again, 20ft, 6in. + 30ft. 9in. = 51ft. 3in. or 615 in. to be deducted : Then, 6979in.—615in.=6364in. which÷12 & by 3 quotes 176yds. 2ft. 4in. answer.

(19) Thus inversely: As 12in. : 20ft. :: 7½in. Or, as 24 half in. : 20ft. :: 15half in. : 32ft. For 24 × 20 = 480 which÷15 = 32ft. answer.

(20) First, 20×5=100miles A travels before B sets out; and 25—20=5 miles B gains upon A in one day's travelling : Then say as 5 m. : 1day :: 100m. : 20 days. and 20×25=500 miles. answer.

(21) 50—35=15 gallons the cistern retains in one hour : Then say, as 15 gal. : 1 hr. :: 230 gal. : 15hr. 20 min. answer.

(22)

	min.	Cis.		min.	Cis.
As	10	1	::	60	6
	20	1	::	60	3
	40	1	::	60	1½
	80	1	::	60	0¾

The 4 cocks in 1 hr. would fill 11¼ cis.

Cis. min. Cis. min. sec.
Then As 11¼ : 60 :: 1 : 5 20 answer.
4 4 4
45) 240 4
225(5min. 20 sec.
15
60
900÷45=20 seconds.

(23) Thus : As 365 days. 6 hr. : 596900000m. :: 1 min. Or, as 525960 min : 596900000mf. :: 1 min. : 1134 miles. + For 596900000÷525960=1134 miles. ans.

(24) First, 75÷60=1¼ pulsations in one second; Then, as 1¼ pul. : 1142ft. :: 6 pul, Or, As 5 fourths : 1142ft. :: 24 fourths : 5481ft.=1 m. 201 ft. answer.
For 5481÷(5280 the feet in a mile)=1 m. 201ft. ans.

(25) Thus : As 1sec. 1142ft. :: 1min. 3sec. Or, as 1sec. : 1142ft. :: 63sec. : 71946, & 71946÷(5280=the feet in a mile)=13m. 5fur. answer.

DOUBLE RULE OF THREE DIRECT.

EXAMPLES.

(2) By two statings thus : As 4 men : 48 days :: 8 men : 96 days. Second, as 12days : 96acres :: 16days : 128 acres. answer.

Or thus, as 4men / 12 days ▸ acres 48 ◂ 8men / 16days ▸ 128 acres.

For 48×16×8÷12×4=128 acres answer.

(3) Thus: As 12)ox. 12 : 20 :: 24)acres; Then, as 16)16 : 40 :: 48)16
— 2 — — 3 —
1 — 2 1 — 3

24 oxen in 16 days eat 40 acres. answer 120 acres.

(4) As 18 horses / 20 days ▸ Bu. 10 ◂ 60 horses / 36 days. ▸ 60 Bushels ans.
For 60×36×10÷18×20=60 Bushels answer.

(5) 7)men lbs. 7)men 14 days 14 lbs. days lbs.
Thus : As 7 : 56 :: 21 Then, as 14 : 168 :: 3 : 36 ans.
— 3 — — —
1 — 3 1 12
168 3
36 lbs. answer.

(7) 8)men *s.* 8)men.
Thus : As 8 : 64 : : 48
— 6 —
1 — 6
384
As 4)days *s.* 4)days
Then, as 4 : 384 : : 16
— 4 —
1 — 4
s. 1536÷20=76*l* 16*s.* answer.

mo. *L.* mo.
(7) Thus : as 7,00*l.* : 14*l.* : : 4,00*l.* Then, as 6 : 8 : : 60=
5 years. 4 60
56÷7=8*l.* 480÷6=80*l.* ans.

days acres days acres
(8) 16)men 16)acres men. Then as 7 : 168 : : 19 : 456
Thus : as 16 : 112 : : 24 19
— — 7 —
1 7 — answer 3192÷7=456A.
acres 168
(9) 16)men *L.* *s.* 16)men. Then as 8)da. *L.* *s.* 8)da.
Thus : as 16 : 16 18 : : 32 8 : 33 16 : : 24
— 2 — — 3 —
1 — 2 1 — 3
L. 33 16 *L.* 101 8 ans.

L. *s.* *d.*
(10) From 78 7 6
Take 75 0 0
3)mo. 3)mo.
Thus : as 9 : 3 7 6 : : 12
— 4 —
3 — 4
3)13 10 0
L. 4 10
25)*L.* *L.* *s.* 25)*L.* *L.*
Then, as 75 : 4 10 : 100 : 6
— 4 —
3 — 4
3)18 0
L. 6 per cent. answer.

(11) Thus : 1st, As 6men : 120*l.* : : 14men : 280*l.* Then, 2nd, as 21w. : 280*l.* : : 46w. : 613*l* 6*s.* 8*d.* For 280 ×46=12880 which÷21=613*l.*$\frac{7}{21}$ or 613*l* 6*s* 8*d.* ans.

(12) Thus : As 100*l.* : 5*l.* : : 259*l* 13*s* 5*d.*

5

100)1298 7 1

Interest for a year *L.* 12 19 8 +

2nd 4)w. 4)w.

As 52 : 12*l* 19*s* 8*d.* : : 20

5

13 13)64 18 4

L. 4 19 10½ answer.

(13) Thus; As 2m. : 12R. : : 8m.

8

2)96

6)days 6)days

Second, as 6 : 48R. : : 24

4 4

1 4

answer 192 rods.

(14) As 8C. : 6,40cts. : : 4C. 2d, as 128m. : 3,20 : : 32

4 4 1

8)25,60 4)3,20

answer 80 cts.

(15) First, as 200lbs : : 40cts. : 20200lb.

40

2,00)8080,00

Dols. 40,40

Second, As. 40m. : 40,40cts. : : 60m.

60

2424,00÷40=60D.60ct. answer.

(16) Thus : As { 12C. / 9 / 108 : 16*l.* :: } ½)50C.×2½ / 100 ÷ 25 / 125 × 16 / 108)2000 (18*l.* 10*s* 4*d.*$\frac{4}{9}$

20)Leag. *L.* *s.* *d.* 20) Leag. 108

2ndly, as 20 : 18 10 4$\frac{4}{9}$ :: 100 — 5 — 5 — 920 — 864

1 — 56×20

answer *L*, 92 11 10$\frac{2}{9}$ — 108)1120(10*s.* — 108 — 40×12 — 108)480(4*d.* — 432 — 48 — 108 — $\frac{4}{9}$*d.*

EXAMPLES.

D. days D. m. days m.

(2) 1st. As 4 : 3 :: 40 2nd, As 8 : 30 :: 20 Inversely.

4)120 — 8 — 2,0)24,0

30 days. ans. 12 days.

8) *s.* men. 8) *s.* days. men. days.

(3) 1st. As 24 : 4 :: 96 2ndly, As 3 : 16 :: 16

3 — 12 — 4 — 3)48 — men. 16 — 3 — 16)48(3 men ans. — 48

(4) Thus : 1st. As 3)15*l.* : 333*l* 6*s* 8*d.* :: 3)6*l.*

5 — 2 — 2

5)666 13 4

2ndly, inversely, As 9m. : *L.* 133 6 8 :: 12 — 9

12) 1200 0 0

answer *L.* 100

(5) Thus : 1st. As, 40cts. : 40m. :: 6060cts. : 6060m. 2nd. Inversely, as 2,00lb. : 6060m. :: 202,00lb. : 60m. For 6060×2=12120 which÷202=60 miles. answer.

(6) Thus : 1st, As 32×40=1280 : 8 days :: 28×40=1120 : 7days.

2nd, Inversely, as 145men : 7days :: 68men.

7

1015÷68=14$\frac{23}{68}$da. or, 14D.11$\frac{9}{17}$hr. ans.

(7) Thus : 1st. As 276m. : 16 :: 852 : 49$\frac{9}{23}$days For 852×16=13632 which÷276=49$\frac{108}{276}$, or. 49D. 4hr. 41+min.

2nd. Inversely, As 2)14hr. : 49da. 4hr. 41min. :: 2)12hr.

7 — 7 — 6

6)345 8 47

answer 57D. 7hr. 27+min.

(8) Thus : First by a double stating Inverse.

As { 9*s*. per bu. / 15 men. } ▶ 6 day ◀ { 6*s*. per bu. / 30 men. } ▶ 4½ days.

For 9×15×6=810 which÷6×30=4½ days for 3*s*. worth : Then, 2d. As 3*s*. : 4½days :: 13*s* 4*d*. or, as 36*d*. : 9 half days. :: 160*d*. : 20days. For 160×9=1440 which÷36=40 half days, or, 20 days answer.

(9) Thus : 1st, Inversely, As 12m. : 100*l*. : 5m. : 240*l*.

100

1200÷5=240*l*.

2nd. As 8*l*. : 240*l*. :: 8*l*. 12*s*. : 258*l*. answer.

(10) Thus : 1st, As 50)100*l*. : 22w. 6d. :: 50)150*l*.

2 — 3 — 3

2)68 4

weeks 34 2

Then 2nd, As 5men : 34w. 2d. :: 12men.

Inversely,

5

12)171 3

answer w. 14 2 days.

Application.

(1) Thus: As 4 : 7 :: 10 Then, as 7 : 17½ :: 46

mo. Bu. mo. Pers.Bu. Pers.

10 ×17½

4)70 7)805

answer 17½ Bushels. answer 115 Bu.

(2) Thus; As 60)60A. : 36men :: 60)240A.

1 4

144 men.

Then, Inversely, as 5days : 144men. :: 12 days

5

12)720

answer 60 men.

(3) Thus: As 3,00Pr. : 5men :: 9,00

9

45 ÷3=15 men.

Then, Inversely, as 4,0days : 15men :: 6,0days : 10men

4

60÷6=10men answer.

(4) Thus: As 50)150M. : 42*s*. :: 50M.

3 1 1

3)42

14*s*.

Then, as 3C. : 14*s*. :: 7C. 2qrs. 14lb. Or, As 112lbs. : 14*s*. :: 854lbs. : 35*s*. 7*d*. answer.

(5) From 8000 C.wt.

Take 4500

remains 3500 C.wt.

5)C.wt.Hor.5)C.wt.Hor.

Thus, 1st, as 45,00 : 18 :: 35,00 : 14

9 7 7

126÷9=14 horses in 6 days.

2nd. Inverse, as 6days : 14horses :: 3days : 28horses. For 14×6=84 which÷3=28 horses. answer.

(6) Thus : 1st. As 2,0C. : 5*L*. : : 4,0C.

4

20÷2=10*l*.

Then, 2nd. As 5,0 : 10*L*. : : 10,0

10

100÷5=20*l*. answer.

(7) Thus : 1st. As 1yr. : 576Bu. : : 6yr.

6

3456 Bu.

Then, 2nd. As 48 Bu. : 3456 Bu. : : 240 Bu.

1 5 5

17280 Bushels ans.

(8) Thus : 1st. As 40)80A. : 6days : : 40)200A.

2 5 5

30÷2=15 Dollars.

Then, 2nd. inverse. As 12men : 15days : : 25men : 7½days

12

180÷25=7½ days. ans.

L. s. d. *L. L. s. d.* *L.*

(9) First, 88 17 4—86=2 17 4=Interest of 86 for 8 months. Then, 1st, as 4)8m : 2*l* 17*s* 4*d*. : : 4)12m.

2 3 3

2)8 12 0

L. 4 6 0

2nd. As 86*l*. : 4*l* 6*s*. : : 100*l*. : 5*l*.

10

43 0

10

L.430÷86=5*l*. answer.

PRACTICE.

CASE 1.

EXAMPLES.

(2)

½	½	6812 at ½	
	12	3406	
	2,0	28,3 10	

Facit *L.* 14,3 10

(3)

½	½	4712 at ¾	
¼	½	2356	
		1178	
	12	3534	
	2,0	29,4 6	

Facit *L.* 14 14 6

(4)

¼	¼	15344 at ¼
	12	3836
	2,0	31,9 8

Facit *L.* 15 19 8

(5)

½	½	7672 at ½
	12	3836
	2,0	31,9 8

Facit *L.* 15 19 8

(6)

½	½	9424 at ¾
¼	½	4712
		2356
	12	7068
	2,0	58,9

Facit *L.* 29 9

CASE 2.

(2)

¼	¼	8612 at 1¼*d.*
		2153
	12	10765
	2,0	89,7 1

Facit *L.* 44 17 1

(3)

d.		
2	⅙	1218 at 2½*d.*
½	¼	203
		50 9
	2,0	25,3 9

Facit *L.* 12 13 9

(4)

d.		
3	½	7812 at 3½d.
¾	¼	1953
		488 3
	2,0	244,1 3

Facit *L.* 122 1 3

(5)

d.		
4	⅓	8120 at 4d.
	2,0	270,6 8

Facit *L.* 135 6 8

(6)

d.		
4	⅕	8121 at 5¼d.
1	¼	2707
¼	¼	676 9
		169 2¼
	2,0	355,2 11¼

Facit *L.* 177 12 11¼

(7)

d.		
6½	½	1218 at 6½d.
½	1/12	609
		50 9
	2,0	65,9 9

Facit *L.* 32 19 9

(8)

d.		
6	½	6120 at 7½d.
1½	¼	3060
¼	⅙	765
		127 6
	2,0	395,2 6

Facit *L.* 197 12 6

(9)

d.		
6	½	7100 at 8d.
2	⅓	3550
		1183 4
	2,0	473,3 4

Facit *L.* 236 13 4

(10)

d.		
6	½	4121 at 9½d.
3	½	2060 6
¼	1/12	1030 3
		85 10¼
	2,0	317,6 7¼

Facit *L.* 158 16 7¼

(11)

d.		
6	½	1002 at 10½d.
3	½	501
1½	¼	250 6
		125 3
	2,0	87,6 9

Facit *L.* 43 16 9

(12)

6	½	2345 at 11½*d.*	
4	¼	1172	6
1½	⅛	781	8
½	1/16	293	1½
		48	10¼
2,0		229,6	1¾

Facit *L.* 114 16 1¾

(13)

3	¼	6002 at 4½*d.*	
1½	⅛	1500	6
		750	3
2,0		225,0	9

Facit *L.* 112 10 9

(14)

d.			
6	½	3001 at 9*d.*	
3	⅛	1500	6
		750	3
2,0		225,0	9

Facit *L.* 112 10 9

(15)

d.			
4	⅕	7182 at 5*d.*	
1	¼	2394	
		598	6
2,0		299,2	6

Facit *L.* 149 12 6

(16)

6	½	3591 at 10*d.*	
4	⅕	1795	6
		1197	0
2,0		299,2	6

Facit *L.* 149 12 6

(17)

d.			
4	⅕	6128 at 5½*d.*	
1½	⅛	2042	8
		766	0
2,0		280,8	8

Facit *L.* 140 8 8

(18)

d.			
6	½	3064 at 11*d.*	
4	⅕	1532	
1	¼	1021	4
		255	4
2,0		280,8	8

Facit *L.* 140 8 8

Or thus;

d.			
1	1/12	3064 at 11*d.*	
		255	4
2,0		280,8	8

Facit *L.* 140 8 8

CASE 3.

(2)

d.			
$1\frac{1}{2}$	$\frac{1}{8}$	6100 at $13\frac{1}{2}$	
		762	6
2,0		686,2	6

Facit *L.* 343 2 6

(3)

d.			
2	$\frac{1}{6}$	1210 at $14\frac{1}{4}d.$	
		201	8
$\frac{1}{2}$	$\frac{1}{4}$	50	5
$\frac{1}{4}$	$\frac{1}{2}$	25	$2\frac{1}{2}$
2,0		148,7	$3\frac{1}{2}$

Facit *L.* 74 7 $3\frac{1}{2}$

(4)

d.			
3	$\frac{1}{4}$	1260 at 15*d.*	
		315	
2,0		157,5	

Facit *L.* 78 15

(5)

d.			
3	$\frac{1}{4}$	7121 at $16\frac{1}{2}d.$	
1	$\frac{1}{12}$	1780	3
$\frac{1}{4}$	$\frac{1}{4}$	593	5
		148	$4\frac{1}{2}$
2,0		964,3	$0\frac{1}{2}$

Facit *L.* 482 3 $0\frac{1}{2}$

(6)

4			
$1\frac{1}{2}$	$\frac{1}{8}$	2340 at $17\frac{1}{2}d.$	
		780	
		292	6
2,0		341,2	6

Facit *L.* 170 12 6

(7)

d.			
6	$\frac{1}{2}$	7890 at $18\frac{3}{4}$	
$\frac{3}{4}$	$\frac{1}{8}$	3945	
		493	$1\frac{1}{2}$
2,0		1232,8	$1\frac{1}{2}$

Facit *L.* 616 8 $1\frac{1}{2}$

(8)

6	$\frac{1}{2}$	8900 at 19*d.*	
1	$\frac{1}{8}$	4450	
		741	8
2,0		1409,1	8

Facit *L.* 704 11 8

(9)

6	$\frac{1}{2}$	7120 at $20\frac{1}{4}$	
2	$\frac{1}{3}$	3560	
$\frac{1}{4}$	$\frac{1}{8}$	1186	8
		148	4
2,0		1201,5	0

Facit *L.* 600 15 0

(10)

d.			
6	$\frac{1}{2}$	2100 at $21\frac{1}{2}d.$	
3	$\frac{1}{2}$	1050	
$\frac{1}{2}$	$\frac{1}{6}$	525	
		87	6
2,0		376,2	6

Facit *L.* 188 2 6

(11)

d.			
4	$\frac{1}{4}$	6812 at $22\frac{1}{4}d.$	
6	$\frac{1}{2}$	2270	8
$\frac{3}{4}$	$\frac{1}{8}$	3406	0
		425	9
2,0		1291,4	5

Facit *L.* 645 14 5

(12)

d.			
6	$\frac{1}{2}$	9999 at $23\frac{1}{4}d.$	
4	$\frac{1}{3}$	4999	6
1	$\frac{1}{4}$	3333	0
of 6*d.*	$\frac{3}{4}$	$\frac{1}{8}$	833	3
			624	$11\frac{1}{4}$
	2,0		1978,9	$8\frac{1}{4}$

Facit *L.* 989 9 $8\frac{1}{4}$

(13)

d.			
6	$\frac{1}{2}$	19998 at $23\frac{3}{4}d.$	
4	$\frac{1}{3}$	9999	
1	$\frac{1}{4}$	6666	
of 6*d.*	$\frac{3}{4}$	$\frac{1}{8}$	1666	6
			1249	$10\frac{1}{2}$
	2,0		3957,9	$4\frac{1}{2}d.$

Facit *L.* 1978 19 $4\frac{1}{2}$

(14)

d.			
2	$\frac{1}{6}$	12345 at 14*d.*	
		2057	6
	2,0	1440,2	6

Facit *L.* 720 2 6

(15)

d.			
4	$\frac{1}{3}$	9876 at $17\frac{1}{2}d.$	
$1\frac{1}{2}$	$\frac{1}{8}$	3292	
		1234	6
	2,0	1440,2	6

Facit *L.* 720 2 6

(16)

d.			
6	$\frac{1}{2}$	7910 at $19\frac{1}{2}d.$	
$1\frac{1}{2}$	$\frac{1}{4}$	3955	
		988	9
	2,0	1285,3	9

Facit *L.* 642 13 9

(17)

d.			
4	$\frac{1}{3}$	6780 at $22\frac{1}{2}d.$	
6	$\frac{1}{2}$	2260	
$\frac{3}{4}$	$\frac{1}{8}$	3390	
		423	9
	2,0	1285,3	9

Facit *L.* 642 13 9

CASE 4.

(2)

		121 at 3*s.*
		3
2,0		36,3

Facit *L.* 18 3

(3)

s.		
5	$\frac{1}{2}$	471 at 5*s.*

Facit *L.* 117 15

(4) 191 at 8*s.*

4 4

Fac. *L.* 76 8

(5) 242 at 11*s.*

11

2,0) 266,2

Facit *L.* 133 2

(6) 600 at 13*s.*

13

2,0) 780,0

Facit *L.* 390

(7) 171 at 16*s.*

8 8

Fac. *L.* 136 16

(8) 2,0) 100 at 19*s.*

5

Facit *L.* 95

(9) 612 at 9*s.*

9

2,0) 550,8

Facit *L.* 275 8

(10) 306 at 18*s.* (11) 860 at 7*s.* (12) 430 at 14*s.*

9 9 7 7 7

Facit *L.* 275 8 2,0)602,0 Facit *L.* 301 0

Facit *L.* 301 0

CASE 5.

(2) *s. d.* |2|6|½|569 at 2 6 (3) *s. d.* |3|4|⅓|69 at 3 4

Facit *L.* 71 2 6 Facit *L.* 11 10

(4) *s.* |6| *d.* |8| ½ |478 at 6 8 (5) *s.* |10| |3| *d.* |4| ½ |400 at 13 4 |⅓|200

66 13 4

Facit *L.* 159 6 8 Facit *L.* 266 13 4

(6) *s.* |10| |6| ½ |8| ⅕ |789 at 16 8 |394 10 263 0

Facit *L.* 657 10

(7) *s.* |5| *d.* |6| ½ |3| ⅒ |⅓| ½ |765 at 5 9 |191 5 19 2 6 9 11 3

Facit *L.* 219 18 9

(8) *d.* |2| ⅛ |841 at 13 2

13

10933

140 2

2,0)1107,3 2

Facit *L.* 553 13 2

(9) *d.* |4| ⅓ |1| ¼ 807 at 16 5

16

12912

269

67 3

2,0)1324,8 3

Facit *L.* 662 8 3

(10) *d.* |1| 1/12 |969 at 19 11

2,0) 8,0 9

deduct 4 0 9 price at 1 *d.*

Facit *L.* 964 19 3

(11)

s.	d.		
		½	244 at 5 8½
	6	1/10	61
	2	⅓	6 2
	½	¼	2 0 8
			0 10 2

Facit *L.* 69 12 10

(12)

d.		
	⅓	875 at 1s. 4¾d.
½	⅓	291 8
¼	½	36 5⅓
		18 2¾
2,0		122,1 4¼

Facit *L.* 61 1 4¼

(13)

4d		
	⅓	7524 at 3s 5½d.
		3
1½	⅛	22572
		2508
		940 6
2,0		2602,0 6

Facit *L.* 1301 0 6

(14)

3d		
	¼	3715 at 9s 4d.½
		9
		63435
1⅓	½	928 9
		464 4½
2,0		3482,8 1½

Facit *L.* 1741 8 1½

(15)

6d		
	½	2572 at 13s 7½d.
		13
		33436
1½	¼	1286
		321 6
2,0		3504,3 6

Facit *L.* 1752 3 6

(16)

6d		
	½	5144 at 6s 9¾d.
		6
		30864
3	½	2572
¾	¼	1286
		321 6
2,0		3504,3 6

Facit *L.* 1752 3 6

(17)

⅛		
	½	4567 at 19s 11d.½
12		22831½
2,0		19,0 3⅓
deduct		9 10 3⅓ price at ½
Facit *L.*		4557 9 8½

(18)

4		
	⅓	9134 at 9 11¾
		9
6	½	82206
		3044 8
1½	¼	4567 0
¾	⅙	1141 9
		190 3½
2,0		9114,9 8½

Facit *L.* 4557 9 8½

CASE 6.

(2) 26×11 at 11*l* 14*s*.

7 — 7

18 4
286 0

Facit 304 4

(3) 36×5 at 5*l* 13*s*.

13

2,0)46,8
23 8
180 0 = 36×5*l*.

Facit *L*. 203 8

(4)

s.	*d*.			*l*. *s*. *d*.
3	4	$\frac{1}{6}$	47 at	3 3 4
			3	
			141	
			+ 7 16 8	
Facit *L*.			148 16 8	

(5)

s.	*d*.			*l*. *s*. *d*.
6	8	$\frac{1}{3}$	156 at	3 6 8
			3	
			468	
			52	
Facit *L*.			520	

(6)

s.	*d*.			*l*. *s*. *d*.
10		$\frac{1}{2}$	78 at	6 13 4
			6	
			468	
3	4	$\frac{1}{3}$	39	
			13	
Facit *L*.			520	

(7)

s.	*d*.			*l*. *s*. *d*.
10	0	$\frac{1}{2}$	457 at	14 17 9$\frac{1}{2}$
			14	
6	8	$\frac{1}{3}$	6398	
1		$\frac{1}{10}$	228 10	
			152 6 8	
	1$\frac{1}{2}$	$\frac{1}{3}$	22 17 0	
			2 17 1$\frac{1}{2}$	
Facit *L*.			6804 10 9$\frac{1}{2}$	

(8)

d.			*l*. *s*. *d*.
4	$\frac{1}{3}$	914 at	7 8 10$\frac{3}{4}$
		148	20
6	$\frac{1}{2}$	7312	148
		12796	
		304	8
$\frac{3}{4}$	$\frac{1}{8}$	457	0
		57	1$\frac{1}{2}$
2,0		13609,0	9$\frac{1}{2}$

Facit *L*. 6804 10 9$\frac{1}{2}$

(9)

		L.	*s*.	*d*.
500 at		12	19	11$\frac{1}{2}$
				10
By compound mul.		129	19	7
				10
		1299	15	10
				5
Facit *L*.		6498	19	2

(10) 1000 at L. 6 9 $11\frac{3}{4}$

		10
64	19	$9\frac{1}{2}$
		10
649	17	11
		10
Facit *L.* 6498	19	2

CASE 7.

(2) C. qr. lb. 12 2 14 at *L.* 3 14 0

12

qr.	lb.				
2			$\frac{1}{2}$	44	8	0
	14		$\frac{1}{4}$	1	17	0
				0	9	3
Facit *L.*				46	14	3

(3) C. qr. lb. 37 2 14 at 7 10 9×1

$4\times9+1=37$

30	3	0
		9
qr. lb. 271	7	0
2 | $\frac{1}{2}$	7	10	9
278	17	$9\frac{1}{2}$
14 | $\frac{1}{4}$	3	15	$4\frac{1}{2}$
	0	18	10
Facit *L.* 283	11	$11\frac{1}{2}$	

(4) C. qr. lb. 9 2 26 at *L.* 4 10 $4\frac{1}{2}$

qr. lb. 9

of 1 c. wt.

2	$\frac{1}{2}$	40	13	$4\frac{1}{2}$
16	$\frac{1}{4}$	2	5	$2\frac{1}{4}$
8	$\frac{1}{2}$	0	12	$10\frac{3}{4}$
2	$\frac{1}{4}$	0	6	$5\frac{1}{4}$
		0	1	$7\frac{1}{4}$
Facit *L.*		43	19	6

(5) C. qr. lb. 5 2 10 at 2 18 $6\frac{1}{2}$

qr. lb. 5

of 2 qr.

2	$\frac{1}{2}$	14	12	$8\frac{1}{2}$
8	$\frac{1}{4}$	1	9	$3\frac{1}{4}$
2		0	4	2
		0	1	$0\frac{1}{2}$
Facit *L.*		16	7	$2\frac{1}{4}$

(6) 59 C. 1 qr. 14 lb. at 1 8 $7d.\times3$

$7\times8+3$

qr. lb.

1		$\frac{1}{2}$	10	0	1
					8
			80	0	8
	14	$\frac{1}{2}$	4	5	9
			0	7	$1\frac{3}{4}$
			0	3	$6\frac{3}{4}$
Facit *L.*			84	17	$1\frac{1}{2}$

(7) C. qr. lb. *L.* *s.* *d.*
72 3 27 at 8 11 5

qr. lb. 9×8=72

	2		½	77	2	9
						8
	1		½	617	2	0
of 1 c.wt.		16	1/7	4	5	8½
		8	½	2	2	10¼
		2	¼	1	4	5¾
		1	⅓	0	12	2¾
				0	3	0½
				0	1	6¼

Facit *L.* 625 11 10

(8) qr. lb. *L.* *s.* *d.*
2 14 at 3 7 6

qr. lb.

	2	½	1	13	9
of 2 qr.	14	¼	0	8	5¼

Facit *L.* 2 2 2¼

(9) lbs. *L.* *s.* *d.*
24 at 4 17 0

lbs.

	16	1/7	0	13	10¼
	8	½	0	6	11

Facit *L* 1 0 9½

(10) lb. *L.* *s.* *d.*
17 at 3 5 4

lb.

	14	⅛	0	8	2
	2	1/7	0	1	2
	1	½	0	0	7

Facit *L.* 0 9 11

(11) lb. oz. *s.* *d.*
27 10 at 1 4

oz.

	6	½		4	0
					9
	4	⅓	1	16	0
			0	0	8
			0	0	5¼

Facit *L.* 1 17 1¼

(12) lb. oz. dwt. gr. *L.* *s.* *d.*
13 10 12 8 at 4 7 6×1

oz. dwt. gr. 12+1=13

	6			½	52	10	0
	4			⅓	4	7	6
of 4 oz.					2	3	9
		10		⅓	1	9	2
of 2 dwt.		2		1/5	0	3	7¾
			8	1/6	0	0	8¾
					0	0	1¼+

Facit *L.* 60 14 10¾

(13) oz.dwt.gr. 17 6 16 at *L.* 3 16 *s.* 8×1 *d.* per oz.
4×4+1=17

15 6 8
4

	dwt.	gr.		*L.*	*s.*	*d.*
				61	6	8
of 1oz.	5		¼	3	16	8
	1		⅕	0	19	2
		12	½	0	3	10
		4	⅓	0	1	11
				0	0	7½

Facit *L.* 66 8 10⅓

(14) yds.qr. 67 2 at *s.* 12 *d.* 2×1
6×11+1

qr.				
2	½	3	13	0
				11
		40	3	0
		0	12	2
			6	1

Facit *L.* 41 1 3

(15) yds.qr. 68 1 at *s.* 8 *d.* 1×2
6×11+2

qr.				
1	¼	2	8	6
				11
		26	13	6
		0	16	2
			2	0¼

Facit *L.* 27 11 8¼

(16) yds. qr. 419 3 at *s.* 12 *d.* 6

s.	*d.*					qr.			
10		½	209	10		2	½	6	3
2	6	¼	52	7	6	1	½	3	1½
				9	4½				

Facit *L.* 262 6 10½ *s.* 9 4½

(17) yds. qr. 839 2 at 6*s* 3*d*.
1

of 2*s*. | *d.* 3 ½ | 83 18 at 2*s*.
3

251 14
10 9 9
3 1½ for 2 qrs.

Facit *L.* 262 6 10½

A. R. P. *L. s. d.*
476 3 28 at 3 7 11×6
(18) 10

R. P. | 33 19 2×7
10
2 ½ | 339 11 8
4
1358 6 8
237 14 2
20 7 6
1 ½ | 1 13 11½
20 ½ | 0 16 11¾ of 1 acre
of 1 R. 8 ⅕ | 0 8 5¾
0 3 4¾

Facit *L.* 1619 11 1¾

A. R. P. *L. s. d.*
953 3 16 at 1 13 11½×3
(19) 10

R. P. | 16 19 7×5
10
2 ½ | 169 15 10
9
1528 2 6
84 17 11
5 1 10½
1 ½ | 0 16 11¾
16 1/10 | 8 5¾
3 4¾

Facit *L.* 1619 11 1¾

Application.

(1) yds.
½ ½ | 18848 at ¾
4712
12)14136
2,0) 1178
Facit *L.* 58 18

(2) *d.* lbs. *d.*
1½ ⅛ | 6789 at 1¾
¼ ⅛ | 848 7½
141 5¼
2,0) 990 0¾
Facit *L.* 49 10 0¾

(3) *d.* gal.
6 ½ | 3906 at 7½*d.*
1½ ¼ | 1953
488 3
2,0)2441 3
Facit *L.* 122 1 3

(4) *d.* oz.
1½ ⅛ | 2004 at 10½*d.*
250 6
2,0)1753 6
Facit *L.* 87 13 6

(5) *d.* yds. *s. d.*
3 ⅓ | 12240 at 1 3⅓
½ ⅙ | 3060
510
2,0|1581,0
Facit *L.* 790 10

(6) *d.* lb. *s. d.*
6 ½ | 1234 at 1 1¼
4 ⅓ | 617
⅓ | 411 4
of 6 *a* ⅓ ⅛ | 102 10
77 1½
2,0|244,2 3½
Facit *L.* 122 2 3½

(7)

s.		gal.	*s.*
4	½	987 at	4

Facit *L.* 197 8

(8)

gal.	*s.*
543 at	11
11	
2,0)597,3	

Facit 298,13

(9)

s.	*d.*	bu.		*s.*	*d.*
6	8	½	138 at	6	8

Facit *L.* 46

(10)

s.	bu.		*s.*	*d.*
10	½	800 at	13	4
3	4	⅓ 400		
		133	6	8

Facit *L.* 533 6 8

(11)

s.	*d.*	bu.		*s.*	*d.*
2	6	⅛	875 at	2	9½
3		1/10	109	7	6
½		⅛	10	18	9
			1	16	5½

Facit *L.* 122 2 8½

(12)

s.	*d.*	Tons		*L.*	*s.*	*d.*
6	8	⅓	94 at	6	6	8
			6			
			564			
				31	6	8

Facit *L.* 595 6 8

(13)

s.	*d.*	T.		*L.*	*s.*	*d.*
10	½	156 at		13	16	8
		13				
6	8	⅓ 2028				
		78				
		52				

Facit *L.* 2158

(14)

T.		*L.*	*s.*	*d.*
2000 at		6	9	11½
				10
By comp. mul.	64	19		9½
				10
	649	17		11
				10
	6498	19		2
				2

Facit *L.* 12997 18 4

(15) 4000 Tons at 12*l* 19*s* 11½*d.*
Say 4000 at 13*l.* = 52000*l.*
4000 at ½ = 8 6 8 Subtract.

Facit *L.* 51991 13 4

(16)

C.	qr.	lb.		*L.*	*s.*	*d.*
8	1	16	at	5	17	9
	qr.	lb.				8
	1			47	2	0
of 1 c. wt.		16	1/7	1	9	5⅛
				0	16	9⅜

Facit *L.* 49 8 3

(17) C. qr. lb. *l. s. d.*
16 2 17 at 2 15 11
4×4

qr.					
2			½	11	3	8
					4
				44	14	8
	16		½	1	7	11½
of 1 C. wt.	1		$\frac{1}{16}$	0	7	11$\frac{3}{4}$
				0	0	5$\frac{3}{4}$+

Facit *L.* 46 11 1

(18) C. qr. lb. *l. s. d.*
144 2 21 at 3 17 6
12×12=144

qr. lb.					
2			½	46	10	0
					12
	14		¼	558	0	0
of 2 qr.				1	18	9
	7		½	0	9	8½
				0	4	10

Facit *L.* 560 13 3½

(19) dwt. gr.
2,0)50 20 *s. d.*
oz. 2 10 20 at 17 6 per oz.
dwt. gr. 2

	10		½	1	15	0
of 10 dwt.		20	$\frac{1}{15}$		8	9
				0	8½	

Facit *L.* 2 4 5½

(20) 9T. 19C. 3qr. 27½lb. at 39*l* 19*s* 11½*d.*

	L.	*s.*	*d.*	
Say 10T. at 40*l* =	400	0	0	
Then 10 half pence. =	0	0	5	
and for the ¼lb. =	0	0	1	0qr. $\frac{4444}{9999}$
From 400*l.* subtract	0	0	6	0qr. $\frac{4444}{9999}$
answer. *L.*	399	19	5	¼ $\frac{4444}{9999}$

By the Rule of Three Direct.

Thus; As 1T. : 39*l* 19*s* 11½*d*. : : 9T. 19C. 3qr. 27½lb. Or,

qr.lb. qr.lb.

As 8960 : 38398qr. : : 89599 : 383975qrs. $\frac{640}{896}$; For 89599 × 38398 = 3440422402 which ÷ 8960 = 383975 $\frac{640}{8960}$qrs. or, 399*l* 19*s* 5*d* 3qrs. $\frac{640}{8960}$. answer.

(21) 19T. 19C. 3qr. 27½lb. at 19*l* 19*s* 11¾*d*.

	L.	*s.*	*d.*	
Say 20T. at 20*l.* =	400	0	0	
Then 20 farthings =	0	0	5	
and ½lb. =	0	0	1	0qr. $\frac{1279}{4480}$
From 400*l.* take	0	0	6	0qr. $\frac{1279}{4480}$
answer *L.*	399	19	5	3qr. $\frac{3201}{4480}$

Or by the Rule of Three Direct.

Thus; As, 1T. : 19*l* 19*s* 11¾*d*. : : 19T. 19C. 3qr. 27½lb. Or, as 4480 half lb. : 19199qrs. : : 89599 half lb. : 383975 qrs. $\frac{3201}{4480}$; For 89599 × 19199 = 1720211201 which ÷ 4480 = 383975 $\frac{3201}{4480}$qrs. or, 399*l* 19*s* 5*d*. 3qr. + answer.

(22)

	C.	qr.	lb.		*L.*	*s.*	*d.*
	289	1	14	at	1	18	9

d.			38*s.*		qr.	lb.				
6		½			1		½	0	9	8½
			2312			14	½	0	4	10
			867							
	3	½	144	6				*s.*	14	6¼
			72	3						

14 6¼ for 1qr. 14lb.

2,0)1121,3 3¼

Facit *L.* 560 13 3¼

(23)

T.	C.	qr.	*L.*	*s.*	*d.*					
371	15	at	4	3	7×1					
					10					
			41	15	10×7					
					10					
			417	18	4					
					3					
			1253	15	0					

then, 1253 15 0

10

	C.		292	10	10
10		½	4	3	7
5		½	2	1	9½
			1	0	10¾

Facit *L.* 1553 12 1¼

oz.dwt.gr. *L.* *s.* *d.*

(24) 420 15 16 at 3 16 10½

10

38 8 9×2

dwt.gr. 10

| 10 | ½ | 384 7 6

4

of 5dwt. 1537 10 0

76 17 6

5 | ½ | 1 18 5½

12 | 1/10 | 0 19 2½

4 | ⅕ | 0 1 11

0 0 7½

Facit *L.* 1617 7 8½

(25) yds. qr. *s.* *d.*

1157 2 at 29 4½

29

d. 10413 |2qr.| ½ |14 8½

| 3 | ⅙ | 2314

| 1½ | ⅙ | 289 3

144 7½

14 8½ = for 2 qrs.

2,0)3400,1 6¾

Facit *L.* 1700 1 6¾

(26) A. R. *s.* *d.*

1157 2 at 117 6

117 R.

|2 | ½ | 58 9

d. 8099

|6 |½| 12727

578 6

58 9 = for 2 roods.

2,0)13600,6 3

Facit *l.* 6800 6 3

(27) gal.qt. *s.* *d.*

7 casks each 84 1 at 11 3

d. 7 qt.

|3 |¼| 589 3 |2|½| 5 7½

11 |1|½| 2 9¾

6479 *v.* 8 5¼

147 3

8 5¼ for 3 qts.

2,0)663,4 8¼

Facit *l.* 331 14 8¼

(28) yds. qr. s. d.
139 3 at 39 4
39

qr.
4 | 1/2 | 1251 | 2 | 1/2 | 19 8
417 | 1 | 1/2 | 9 10
s. 29 6

46 4
29 6 for 3 qrs.

2,0)549,6 10
Fac. *l.* 274 16 10

(29) yds. qr. *l.* s. d.
279 2 at 3 18 8
78
20

qr.
6 | 1/2 | 2232 | 2 | 1/2 | 78 8
2 | 1/2 | 1/2 | 1953
s. 39 4

139 6
46 6
39 4 for 2 qrs.

2,0)2198,7 4
Facit *l.* 1099 7 4

(30) qr. na. s. d.
3 2 at 17 6 per yd.

qr.
2 | 1/2 | 8 9
1 | 1/2 | 4 4 1/2
2 | 1/2 | 2 2 1/4

Facit *s.* 15 3 3/4.

(31) oz. *L.* s. d.
12 at 3 10 0 per lb.

oz.
8 | 1/2 | 1 15
4 | 1/2 | 0 17 6

Facit *l.* 2 12 6

TARE AND TRETT.

CASE 1.

EXAMPLES.

(2) C. qr. lb.
456 1 19 gross.
— 15 2 13 tare.

440 3 6 neat

L. s. d.
1 15 8
10
17 16 8×4
10

qr. lb.
2 | 1/2 | 178 6 8
4
713 6 8
71 6 8
of 1 qr. 1 | 1/2 | 0 17 10
4 1/2 | 1/2 | 0 8 11
2 1/2 | 1/2 | 0 1 3 1/2
0 0 7 1/2

Amount *L.* 786 1 11 3/4

(3)

lbs.	C.	qr.	lb.
3140 ÷ 112 =	28	0	4
C.wt. neat =	173	3	8

	L.	*s.*	*d.*
at	1	17	6 × 3
to			
	18	15	0 × 7
			10
	187	10	0
½	131	5	0
	5	12	6
½	0	18	9
⅛	0	9	4½
	0	2	8+
Amount *l.*	325	18	3½

of 2 qr. = 1 | 8

(4)

	C.	qr.	lb.	lb.
No. 1 =	4	2	14	gr. tare 21
2 =	3	0	17	18
3 =	3	4	10	39
	13	2	13	gross 2 22
	— 0	2	22	tare
neat wt.	12	3	19	at *l.* 2 4 7
				12

	qr.	lb.		
	26	15	0	
½	1	2	3½	
¼	0	11	1¾	
⅛	0	5	6¾	
¼		1	7	
½		0	4¾	

of 1 qr. = 2 | 1 | 14 | 4 | 1

	C.	qr.	lb.	lb.
No. 4 =	6	1	16	gr. tare 27
5 =	3	2	18	19
	10	0	6	gross 1 18 ta.
	— 0	1	18	tare
neat wt.	9	2	16	at *L.* 2 17 6
				9

	qr.	lb.		
	25	17	6	
½	1	8	9	
⅛	0	8	2½	

of 1 C. = 2 | 16 | ½ | ⅛

C.	qr.	lb.			
9	2	16	cost	27	14 5½
12	3	19 =		28	15 11¾
neat. 22	2	7	val.	56	10 5¼

Value of 3 first *L.* 28 15 11¾

CASE 2.

(2) 317 × 70 = 22190 lbs. gross.
61 × 70 = 1120 tare.
lbs. neat 21070 at 12*s* 6*d*.

s.	*d.*		
			10535
10		½	
2	6	¼	2633 15
amount *L.*			13168 15

(3) C. qr. lb.
86 2 14 gross.
16×100÷112=14 1 4 tare.
L. *s.* *d.*
neat weight C. 72 1 10 at 3 15 10
9
34 2 6
8
qr. lb.
1 ¼ 273 0 0
0 18 11½
of 1 C.wt. 8 ½ 0 5 5
2 ¼ 0 1 4½
Facit *L.* 274 5 8¾

(4) C. qr. lb.
18 2=2072 gross
lb. 37×4= 148 tare
lbs. neat 1924 at 4*s* 6*d*. per lb.
s. *d.*
4 ½ 384 16
6 ⅛ 48 2
Value *l.* 432 18

CASE 3.

EXAMPLES.

(2) C. qr. lb. lb.
lb. 75 3 14 gross; tare 14 per C.
14 ⅛ 9 1 26 tare
C. 66 1 16 neat at 18*s* 6*d*.
6×11
5 11 0
11
qr. lb.
1 ½ 61 1 0
of 1 C.wt. 16 ¼ 0 4 7½
0 2 7½+
Facit *l.* 61 8 3

(3) C. qr. lb. C. qr. lb.
6 2 12 × 9 = 59 1 24 gross.

lb. C. qr. lb.
16 | 1/7 | 59 1 24 gross; tare per C. 17lb.
1 | 1/16 | 8 1 27
0 2 3
—9 0 2

L. s. d.
C. 50 1 22 neat at 2 12 6
10
26 5 0
5
qr. lb.
1 | 1/4 | 131 5 0
14 1/2 | 0 13 1 1/2
7 1/2 | 0 6 6 3/4
1 1/7 | 0 3 3 1/4
0 0 5 1/2 +
Facit *L.* 132 8 5+

(4) C. qr. lb lb.
lb. 43 3 21 gross, tare 12 per C.
8 | 1/14 | 3 0 15 8
4 | 1/2 | 1 2 7 12
—4 2 23 4 tare.

L. s. d.
C. 39 0 25 12 neat, at 2 15 4 × 1
4 × 10 — 1 = 39
11 1 4
10
lb. oz.
16 | 1/7 | 110 13 4
— 2 15 4
8 | 1/2 | 107 18 0
1 | 1/8 | 0 7 10 2/7
8 | 1/3 | 0 3 11 1/2
4 | 1/2 | 0 0 5 3/4
0 0 2 7/8
0 0 1 1/2
Value *L.* 108 10 7 1/2

CASE 4.

EXAMPLES.

(2) C. qr. lb.
8 3 20
4
35
28
280
72
1000 gross

then 1000 gross
—38 tare
26)962 suttle
—37 trett
925 lb. neat at $8\frac{1}{2}d.$

	d.	
6 $\frac{1}{2}$	462	6
2 $\frac{1}{3}$	154	2
$\frac{1}{2}$ $\frac{1}{4}$	38	$6\frac{1}{2}$

2,0)65,5 $2\frac{1}{2}$
amount *l.* 32 15 $2\frac{1}{2}$

(3) C. qr. lb.
120 2 0 gross
176lb. = 1 2 8 tare
26)118 3 20 suttle
— 4 2 8 trett
C. 114 1 12 N. at 2*l.* 3 8

then 2 3 8×4
10
21 16 8
11

lb.	qr.		
1	$\frac{1}{4}$	240	3 4
8	$\frac{1}{14}$	8	14 8
4	$\frac{1}{2}$	0	10 11
		0	3 $1\frac{1}{4}$
		0	1 $6\frac{1}{2}$

amount *L.* 249 13 $6\frac{3}{4}$

(4) lb. C. qr. lb.
8 $\frac{1}{14}$ 177 0 22 gross
1 $\frac{1}{2}$ 12 2 17
1 2 9
— 14 0 26 tare
26)162 3 24 suttle
— 6 1 2 trett
C. 156 2 22 neat at,

L. s. d.
3 14 0×6
10
37 0 0×5
10

qr.	lb.		
2	$\frac{1}{2}$	370	0 0
		185	0 0
		22	4 0
14	$\frac{1}{4}$	1	17 0
7	$\frac{1}{2}$	0	9 3
1	$\frac{1}{7}$	0	4 $7\frac{1}{7}$
		0	0 $7\frac{3}{4}$

amount *L.* 579 15 $6\frac{1}{4}$

SIMPLE INTEREST.

CASE 1.

EXAMPLES.

(2) *L.* *s.* *d.*
87 14 5 at 6*l.*
6
5,26 6 6
20
5,26
12 *L.* *s.* *d.*
ans. 5 5 3
3,18

(3) *L.* *s.* *d.*
173 17 8½ at 7*l.*
7
12,17 3 11½
20
3,43 *L.* *s.* *d.*
12 173 17 8½ Prin.
5,27 12 3 5½ Int.
4 *L.* 186 1 1½ amo.
1,10

(4) *L.* *s.* *d.*
176 13 9 at 5*l.*

L.
5 | 1/20 | 8 16 8½ = Int. for 1 year.
9
79 10 2½ do. for 9 yr.
176 13 9 Principal.
L. 256 3 11½ = amount.

CASE 2.

EXAMPLES.

(2) *L.* *L.* *s.* *d.*
5 | 1/20 | 427 18 9 at 5¾*l.*
1/5 | 1/10 | 21 7 11¼
1/4 | 1/20 | 2 2 9½
1 1 4¾
24 12 1½
2
Facit *L.* 49 4 3

(3) *L.* *L.* *s.* *d.*
5 | 1/20 | 1096 15 6 at 6½*l.*
1 | 1/5 | 54 16 9¼
1/2 | 1/5 | 10 19 4½
5 9 8
Int. for 1 yr. = *L.* 71 5 9½
4
do. for 4yr. = 285 3 2
Principal 1096 15 6 } +
amount *L.* 1381 18 8 ans.

CASE 3.

EXAMPLES.

(2) *L.*

5	$\frac{1}{20}$	57	17	8	for 3 mo. at 6*l.*
1	$\frac{1}{5}$	2	17	$10\frac{1}{2}$	
		0	11	$6\frac{3}{4}$	
mo. 3	$\frac{1}{4}$	3	9	$5\frac{1}{4}$	Int. for a yr.

answer. *L.* 0 17 $4\frac{1}{4}$ do. for 3 mo.

(3) *L.* *L.* *s.* *d.*

5	$\frac{1}{20}$	150	19	0	for $3\frac{1}{3}$ yr. at 6*l.*
1	$\frac{1}{5}$	7	10	$11\frac{1}{4}$	
		1	10	$2\frac{1}{4}$	
mo. 4	$\frac{1}{3}$	9	1	$1\frac{1}{2}$	Int. for 1 yr.
				3	
		27	3	$4\frac{1}{2}$	do. for 3 yr.
		3	0	$4\frac{1}{2}$	do. for 4 mo.

answer *L.* 30 3 9 do. for $3\frac{1}{3}$ yr.

(4) *L.* *s.*

$\frac{1}{2}$)126 12 for 16 weeks at $4\frac{1}{2}$*L.*

4

506 8

63 6

L. 5|69 14

20

s. 13|94

12

d. 11|28

4

qr. 1|12

w. *L.* *s.* *d.* w.

Then, as 52 : 5 13 $11\frac{1}{4}$ :: 16 Or, as

52w. : 5469qrs. :: 16w. : 1682qrs.

For $5469 \times 16 = 87504$ which $\div 52$

$= 1682$qrs. or 1*l* 15*s* $0d\frac{1}{2}$.

(5)

		L.	*s.*	
½	½	243	17	for 146 days at 5¾*l.*
			5	
		1219	5	
¼	½	121	18	6
		60	19	3
L.	14	02	2	9
		20		
		0 42		

&c. *L.* 14 0 5 Int. for 1yr.

Then, As 365days : 14*l* 0*s* 5*d.* : : 146 days, Or, as 365 days : 3365*d.* : : 146days : 1346*d.* For 3365 × 146 = 491290 which ÷ 365 = 1346*d.* or, 5*l* 12*s* 2*d.* And 243*l* 17*s.* Prin. + 5*l* 12*s* 2*d.* Int. = 249*l* 9*s* 2*d.* amount answer.

(6)

L.			*L.*	*s.*	*d.*	
5		½0	71	3	11½	for 1 yr. 5mo. & 25da. at 6*l.*
1		⅕	3	11	2¼	
			0	14	3¾	
mo.						
4		⅓	4	5	5	Interest for 1 year.
1		¼	1	8	5½	do. for 4 mo.
	15	½	0	7	1¼	do. for 1 mo.
of 1 mo.	10	⅓	0	3	6½	do. for 15 days.
			0	2	4¼	do. for 10 do.
answer			*L.* 6	6	10¾	do. for 1yr. 5mo. 25days.

(7) *L.* *s.* *d.*
116 17 2 for 6 years, 7 mo. & 19da. at 7*l.* per cent.

		7		mo.	day.	*L.* *s.* *d.*	
L.	8	18 0 2		6		½ 8 3 7	Int. for 1 year.
		20				6	
s.	3	60				49 1 6	do. for 6 yr.
		12		1		½ 4 1 9½	do. for 6 mo.
d.	7	22				⅙ 0 13 7½	do. for 1 mo.

As 365da. : 8*l* 3*s* 7*d.* : : 19da. = 8 6 do. for 19days.

54 5 5 Interest.
116 17 2 Principal.
answer *L.* 171 2 7 amount.

(9)

mo.	days.
2) 71	28
½time = 35½	14

L.	s.	d.	
½) 674	13	8¾	
		5×7 = 35	
3373	8	7¾	
		7	

d.						
10	⅓	2361	4	0	6½	22
		33	7	6	10½	4
2	⅓	22	4	17	10¾	4
		4	4	19	6¾	—
		4	4	19	6¾	30÷3 =

L. 242|66 4 4¾

20

s. 13|24

12

d. 2|92

4

qrs. 3|71

	L.	s.	d.
	242	13	2¾
			10 deduct.
Inter. =	242	12	4¾
Prin. =	674	13	8¾
amount L.	917	6	1½

(10)

571 dols.
30 days.

6,0)1551,0

dols. 2,58½

(11)

325 dols.
64 days.

1300
1950

6,0)2080,0

dols. 3,46+

(12)

	31	
	— 5	
July	26	1
August	31	
Sept.	30	
Octo.	31	
Novm.	30	
Decem.	31	
January	9	
	3,0)18,8	
	2) 6 8	
	mo. 3 4 = ½time.	

3da. | 1/10 | L. 100×3

30|0

1/3 | 1|0

L.	s.	d.
	3	6 8
L. 3	13	6 8

20

s. 2|66

12

d. 8|00

L.	s.	d.
3	2	8
31÷3 =	—	10⅓
answer. L. 3	1	9⅔

(13) 2)12 mo. 60)135 days.

6mo. 2¼ mo.

Then ¼)240*l.*×2¼

6

144|0

48|0

6|0

L. 19|80

20

19 16 0

54÷3= 1 6 subtract.

1*L.*=⅙)19 14 6 Interest at 6 per cent.

3 5 9 do. at 1 do.

answer *L.* 23 0 3 do. at 7 per cent.

(14) ½)12mo. 213days. then *L.* 35|43 1

6 3,0)106½

3 16½

20

s. 8|61

12

d. 7|32

4

qr. 1|28

days.

| 15 | ½ | *L.* 371×3

6

222|6

111|3

18|5 10

1|8 11

L. 35|43 1

| 1½ | 1/10 |

L. *s.* *d.*

35 8 7¼

130÷3= 0 3 7¼ subtract.

answer *L.* 35 5 0

(15) ½)12mo. 73days. then 23|51 0 2

mo. da.

mo. 6 36½÷30=1 6⅔

L. *s.* *d.*

325 15 6×1

6

20

s. 10|20

12

d. 2|42

4

qr. 1|68

days.

| 6 | ½ | 195 4 13 0

32|5 15 6

6|5 3 1

5 8 7

| ½ | 1/12 |

L. *s.* *d.*

23 10 2¼

38÷3= 0 1 0¾ deduct

L. 23|51 0 2

1*l.*=⅙)23 9 1¾ at 6 per cent.

3 18 2¼ at 1 do.

answer *L.* 27 7 4 Int. at 7 per.

(16) mo. *L.* *s.* *d.*

$\frac{1}{2}$)11 $\frac{1}{2}$) 148 12 6$\frac{1}{2}$

5$\frac{1}{2}$ 5$\frac{1}{2}$

743 2 8$\frac{1}{2}$

74 6 3$\frac{1}{4}$

L. 8|17 8 11$\frac{3}{4}$

20

s. 3|48

12

d. 5|87

4

qr. 3|51

answer *L.* 8 3 5$\frac{3}{4}$ Interest.

(17) mo. *L.* *s.* *d.*

$\frac{1}{2}$)17 $\frac{1}{2}$)333 13 3$\frac{3}{4}$

8$\frac{1}{2}$ 8$\frac{1}{2}$

2669 6 6

166 16 7$\frac{3}{4}$

L. 28|36 3 1$\frac{1}{4}$

20

s. 7|23

12

d. 2|77

4

qr. 3|11

333 13 3$\frac{3}{4}$ Princip.

28 7 2$\frac{3}{4}$ Interest.

answer *L.* 362 0 6$\frac{1}{2}$ amount.

then *L.* 94|04 0 9

20

s. 0|80

12

d. 9|69

4

qr. 2|76

L. *s.* *d.*

94 0 9$\frac{1}{2}$

157÷3 = 0 4 4$\frac{1}{4}$ sub.

1*l.* = $\frac{1}{6}$)93 16 5$\frac{1}{2}$ Int. at 6*l.*

15 12 8$\frac{3}{4}$ do. at 1*l.*

109 9 2 do. at 7*l.*

651 11 0 Principal.

answer *l.* 761 0 2 amount.

(18) From yr. 18 days 0

Take 15 219

mo. da.

2 146 = 24 146

and 2) 24 146

mo. da.

12 73÷30 = 2 13

L. *s.*

Then multi. 651 11 × 2

by 12

days

10 | $\frac{1}{3}$ | 781 8 12

| | 130|3 2

3 | $\frac{1}{10}$ | 21|7 3 8

| | 6|5 3 1

L. 94|04 0 9

then *L.* 185|91 14 9

20

s. 18|34

12

4|17

4

|68

l. *s.* *d.*

185 18 4

21÷3 = 7 deduct.

ans. *l.* 185 17 9

(19) mo. da. *L.* *s.* *d.*

2)71 25 $\frac{1}{2}$)517 12 8$\frac{1}{2}$

35$\frac{1}{2}$ 12$\frac{1}{2}$ 5

2588 3 6$\frac{1}{2}$

days 7

10 | $\frac{1}{3}$ | 1811 7 4 9$\frac{1}{2}$

| | 25|8 16 4$\frac{1}{4}$

2$\frac{1}{2}$ | $\frac{1}{4}$ | 17|2 10 10$\frac{3}{4}$

| | 4|3 2 8$\frac{1}{2}$

L. 185|91 14 9

(20) 5794×7÷100÷4÷12 answer 8*s.* 5½*d.*

(21)

L.	mo.		*L.*	mo.
½)60	for 7÷2=3½		½)150	for 15÷2=7½
3½			7½	*l. s.* mo.
180			1050	½)75 10 for 9÷2=4½
30			75	4½
L. 2|10			302	0
20			*l.* 11|25	37 15
s. 2|00			20	
			l. 3|39	15
l.	*s.* mo.		*s.* 5|00	20
145	15 for 27÷2=13½.			
	12÷1½=13½.			*s.* 7|95
1½|1½|1749	0			12
218	12 6			*d.* 11|40
l. 19|67	12 6			4
20				qr. 1|60
s. 13|52				
12				
d. 6|30				
4				
qr. 1|20				

L.	*s.*	mo.
¾|½|1 397	12	for 45½÷2=22¾
2		
795	4	
11		
8747	4	
¼|½|198	16	
99	8	
L. 90|45	8	
20		
s. 9|08		
12		
d. 0|96		
4		
qrs. 3|84		

L. Collectively.	*L.*	*s.*	*d.*
60 × 3½=	2	2	0
150 × 7½=	11	5	0
75 10× 4½=	3	7	11¼
145 15×13¾=	19	13	6¼
397 12×22¾=	90	9	0¾
898 17 prin.	*L.* 126	17	6¼+whole Int.
	828	17	0 Prin.

answer *L.* 955 14 6¼+ amount.

INSURANCE COMMISSION, &c.

CASE 4.

EXAMPLES.

(2) *L.* *s.* *d.*
7406 17 6 at 15¾ per cent.
12

3	1/6	8888	2	10	0
1/2	1/4	2222	0	12	6
		5555	3	1½	

L. 1166|58 5 7½
20
s. 11|65
12
d. 7|87
4
qr. 3|50

L. *s.* *d.*
answer 1166 11 7½

(3) *L.* *s.* *d.*

2/4	1/2	704	15	4 at 1¼*l.*
1/4	1/2	352	7	8
		176	3	10

L. 12|33 6 10
20
s. 6|66
12
d. 8|02

L. *s.* *d.*
answer 12 6 8

(4) *L.* *s.* *d.*
L. 7|00 14 6 at 4*s.* per ct.
20
s. 0|14
12
d. 1|74
4
qrs. 2|96

s. *L.*

4	1/5	7	0	1½ at 1*l.* per ct.

L. 1 8 0¼ answer.

(5) *L.* *s.* *d.* *s.* *d.*

5	1/6	420	12	6 at 6	4 per ct.
1	1/3	105	3	1½	
4d	1/3	21	0	7½	
		7	0	2½	

L. 1|33 3 11½
20
s. 6|63
12
d. 7|67
4
qrs. 2|70

ans. 1*l.* 6*s.* 7½*d.*

(6) 85600 dol. × 35 = 2996000 which ÷ 100 = 29960 dol. ans.

CASE 5.

EXAMPLES.

(2) *L.* *s.*
$\frac{1}{2}$)4 10 per cent. per ann.
$9\frac{1}{2}$
40 10
2 5
42 15
100 0
L. 142 15 amount of 100*l.* for $9\frac{1}{2}$ years.

L. *s.* *L.* *L.* *s.*
Then, as 142 15 : 100 :: 856 10 Or,
as 2855*s.* : 100*l.* : : 17130*s.* : 600*l.*
For 17130 × 100 = 1713000, which
÷ 2855 = 600*l.* answer.

CASE 6.

(2) 856dol. 50ct.—600dol. = 256dol. 50ct. whole Interest. Then, as 600dol. : 256dol. 50ct. : : 100dol. : 42dol. 75ct. for $9\frac{1}{2}$years. Then, as $9\frac{1}{2}$yrs. : 42dol. 75ct. : : 1 yr. : 4dol. 50ct. per cent. answer.

CASE 7.

(2) $\frac{1}{2}$)600 at $4\frac{1}{2}$
4
2400
300
L. 27|00
ans. 9yr. 6m.

L. *s.*
From 856 10
Take 600 0 yr. mo.
27)256 10(9 6
243
13
12+6 for 10
162
162

(3) 2000
× 5
dols. 100,00

From 2925 amount.
Take 2000 principal,
925 whole Interest.
Then, as 100dols. : 1yr. : : 925dols. : $9\frac{1}{4}$yr. or 9 yr. 3 mo.
Lastly, 21yr—9yr. 3mo. = 11yr. 9mo. answer.

COMPOUND INTERESTS.

(2)

		L.	s.	d.	
5	$\frac{1}{20}$	400	0	0	
1	$\frac{1}{5}$	20	0	0	
		4	0	0	
5	$\frac{1}{20}$	424	0	0	amt. 1 yr.
1	$\frac{1}{5}$	21	4	0	
		4	4	$9\frac{1}{2}$	
5	$\frac{1}{20}$	449	8	$9\frac{1}{2}$	amt. 2 yrs.
1	$\frac{1}{5}$	22	9	$5\frac{1}{4}$	
		4	9	$10\frac{1}{2}$	
5	$\frac{1}{20}$	476	8	$1\frac{1}{4}$	amt. 3 yrs.
1	$\frac{1}{5}$	23	16	$4\frac{3}{4}$	
		4	15	$3\frac{1}{4}$	
ans.		504	19	$9\frac{1}{4}$	amt. 4 yrs.

(4)

L.

$\frac{1}{4}$)500 at $4\frac{1}{4}$ per cent.

4

2000

125

L. 21|25

20

s. 5|00

L.	s.	
500	0	
21	5	
$\frac{1}{4}$) 521	5	= amount 1 year.
	$4\frac{1}{4}$	
2085	0	
130	6	3
L. 22|15	6	3

20

s. 3|06

12

d. 0|75

4

qrs. 3|00

(3)

dols.

5 = $\frac{1}{20}$)1280 Principal.

+ 64

$\frac{1}{20}$)1344

67,2

$\frac{1}{20}$)1411,20

70,56

$\frac{1}{20}$)1481,76

74,08,8

$\frac{1}{20}$)1555,84,8

77,79,2+

$\frac{1}{20}$)1633,64,0

81,68,2

From 1715,32,2 amount.

Take 1280,00,0 Principal.

answer 435,32,2 comp. Int.

L.	s.	d.	
521	5	0	
22	3	$0\frac{3}{4}$	
$\frac{1}{4}$)543	6	$0\frac{3}{4}$	amount 2 yr.
		$4\frac{1}{4}$	
2173	12	3	
135	17	0	
L. 23|09	9	3	

20

s. 1|89

12

d. 10|71

4

qrs. 2|84

L.	s.	d.	
543	8	$0\frac{3}{4}$	
23	1	$10\frac{1}{2}$	
$\frac{1}{4}$)566	9	$11\frac{1}{4}$	amount 3 yr.
		$4\frac{1}{4}$	
2265	19	9	
141	12	$5\frac{3}{4}$	
L. 24|07	12	$2\frac{3}{4}$	continued

(4) continued, *L.* 24|07 12 $2\frac{3}{4}$

20

s. 1|52

12

d. 6|26

4

qrs. 1|04

L.	*s.*	*d.*
566	9	$11\frac{1}{4}$
24	1	$6\frac{1}{4}$

ans. 590 11 $5\frac{1}{2}$ amt. for 4yr.

(5)

L. *s.*

$\frac{1}{2}$)400 10 at $3\frac{1}{2}$ per cent.

$3\frac{1}{2}$

1201 10

200 5

L. 14|01 15

20

s. 0|35

12

d. 4|20

L.	*s.*	*d.*
400	10	0
14	0	4

$\frac{1}{2}$)414 10 4 amt. 1 year.

$3\frac{1}{2}$

1243	11	0
207	5	2

L. 14|50 16 2

20

s. 10|16

12

d. 1|94

4

qrs. 3|76

L.	*s.*	*d.*
414	10	4
14	10	$1\frac{3}{4}$

$\frac{1}{2}$)429 0 $5\frac{3}{4}$ amt. 2 yrs.

$3\frac{1}{2}$

1287	1	$5\frac{1}{4}$
214	10	$2\frac{3}{4}$

L. 15|01 11 8

20

s. 0|31

12

d. 3|80

4

qrs. 3|20

L.	*s.*	*d.*
429	0	$5\frac{3}{4}$
15	0	$3\frac{3}{4}$
444	0	$9\frac{1}{2}$ amt. 3 yr.
400	10	0 Principal.

ans. *l.* 43 10 $9\frac{1}{2}$ com. Int.

REBATE OR DISCOUNT.

EXAMPLES.

(2) mo. D. c. m.
$6\frac{1}{3}$ 5 00 0
$1\frac{1}{6}$ 2 50 0
41 6
7 91 6
100
amount 107 91 6

Then, as 107dols. 91ct. 6m. : 100 : : 430dols. 67ct. : 399dols. 07ct.+ For 430,67 × 100 = 43067,00 which ÷ 107,916 = 399 dols. 07 ct. present worth.

(3) mo. *L.* *s.* *d.*
4 $\frac{1}{3}$ 3 10 0
1 3 4
100 0 0
L. 101 3 4

Then, as 101*l* 3*s*. 4*d*. : 100*l*. : : 795*l*. 11*s*. 2*d*. Or, as 24280*d*. : 100*l*. : : 190934 : 786*l*. 7*s* 8*d*. For 190934 × 100 = 19093400 which ÷ 24280 = 786*l* 7*s* 8*d*. answer.

(4) *L.* *s.* *d.*
6 $\frac{1}{3}$ 7 0 0 for 12 mo.
2 $\frac{1}{3}$ 3 10 0
1 3 4
100 0 0
L. 111 13 4

Then, as 111*l* 13*s* 4*d*. : 100*l*. : : 112*l* 12*s*. Or, as 26800*d*. : 100*l*. : : 27024*d*. : 100*l* 16*s* 8$\frac{1}{2}$*d*. For 27024 × 100 = 2702400 which ÷ 26800 = 100*l*. 16*s* 8$\frac{1}{2}$*d*. Lastly, 112*l* 12*s*. — 100*l*. 16*s* 8$\frac{1}{2}$*d*. = 11*l* 15*s* 3$\frac{1}{2}$*d*. Rebate. ans.

(5) mo. D. ct.
3 = $\frac{1}{4}$ 5 00
1 25
100
101 25

D. cts.
$\frac{1}{2}$)832

As 101,25 : 100 : : 416 :
100
101,25)41600

The present worth of 416dols. = 410 86 4 for 3mo.

mo. D. c.
6 = $\frac{1}{2}$) 5 00
2 50
100
amt. 102 50

D. c. D. D.
Then, as 102,50 : 100 : : 416
100
102,50)41600

to the pres. worth of 416d. = 405 85 3 for 6mo.
add 410 86 4 for 3mo.
816 71 7 pr. wor.

D. D. cts. m.
Lastly 832 — 816 71 7 = 15 28 3 the answer.

(6) mo. *L.* *s.* *d.* — *L.* *s.* *d.* — *L.* — $\frac{1}{2})100$

4| $\frac{1}{3}$| 5 0 0 then, as 101 13 4 : 100 :: 50

3+2 3

1 13 $\frac{4}{4}$ 305 305)150 00

100

L. 101 13 4 Pres. worth of 50*l.* for 4mo.=*l.*49 3 $7\frac{1}{4}$

mo. *l.* *s.* *d.* — *l.* *s.* *d.* — *l.* — *l.*

again |4|$\frac{1}{3}$|5 0 0 then, as 103 6 8 : 100 :: 50|

—1 13 4 3+1 3

2 6 8 310 310)150 00

100

——— Pres. worth of 50*l.* for 8mo. *l.* 48 7 $8\frac{3}{4}$

103 6 8

Lastly 49*l* 3*s* $7\frac{1}{2}$*d.*+48*l* 7*s* $8\frac{3}{4}$*d.*=97*l* 11*s* 4*d.* ans.

(7) 1st. 5×12=60, &.60+100=160 the amount.

2nd, As 160dols. : 60dols. :: 500dols. : 187dols. 50ct.

Rebate. 3d. 100D. D. 500D. D.

1 yr. > 5 < 12 y. > 300 Interest.

4th. 300—187,50=112,50 in favour of the Interest.

EQUATION.

EXAMPLES.

(2) 50×2= 100

100×5= 500

150×8= 1200

3,00)18,00

answer=6 months.

(3) 400× 5=2000

400×10=4000

1,000)6,000

answer =6 months.

(4) Suppose 20*l.* then,

20÷4= { 5×2=10, 5×4=20, 5×6=30, 5×8=40

2,0)10,0

answer 5 mo.

(5) *L.* *L.* *L.*

1st. 240—40=200, Then,

Inver. as 240*l.* : 5mo. :: 200*l.* : 6mo.

5

12,00÷2,00=6mo. answer.

(6) *L.* *L.* *L.*
1st. 420—60=360, Then,
Inversely, as 420*l.* : 6mo. : : 360*l.* : 7mo.
6
252,0÷36,0=7mo. answer.

BARTER.

EXAMPLES.

(2) lbs. 1C.wt.=112 at 4*s.* per. 4| $\frac{1}{2}$*l.* 22 8=448*s.*
s. lb. *s.* lbs.
Then, as 10 : 1 : : 448 : $44\frac{4}{5}$
answer 44lb. 12oz. $12\frac{4}{5}$drs.

(3) $3\frac{1}{2}$C.wt.=392lbs. at. 5*d.*
5
1960*d.*
s. C. *d.*
2nd. As 28 : 1 : : 1960
12
336)1960(5 C. qr. lb.
3 $9\frac{1}{3}$, answer.

(4) As 20cts. : 25cts. : : 200cts.
200
2,0)500,0
Dols. 2,50 ans.

(5) As 8 6 : 10 : : 18
12 18
102) 180(1 *s.* *d.* 9+ans.
102
78
12
936
918
remains 18

(6) cts. cts. cts.
As 100 : 106 : : 10
10
100)1060
answer 100 6m.

(7) C. *s.* *s.*
41×30=1230
L. 20×20= 400 deduct.
d. lb.
As 5 : 1 : : 830*s.*
12
5)9960
answer 1992 lbs.

(8) 320 doz.
×1,20
384,00—160=224dols. to be laid out for cotton.
Then as 20cts. : 1lb. :: 22400cts. : 1120lb. answer.

(9) 75 sheep at 14 6
174 12
3*s.* 6*d.*=42*d.* 300 174
1275
13050*d.*
17*l.* 12*s.*=4224 deduct.
As 42*d.* : 1bu. :: 8826 : 210bu. 4qts.
For 8826÷42=210$\frac{6}{42}$bu.=210bu. 4qts.+answer.

(10) C.
5
5
5
5
560lbs. at 6*d.*
6
3360 *d.*
Then as 10*s* 8*d.*=128*d.* : 1lb. :: 3360*d.* : 26lb. 4oz.
For 3360÷128=26$\frac{4}{8}$lb. or, 26lb. 4oz. answer.

(11) 63 gals.=1 hhd.
3
s. d. *s. d.*
6 8=$\frac{1}{3}$)189 gals. at 6 8
63*l.*
20
126)1260(10*s.* answer.
126
0

(12) *s.* *s.* *d.* *d.*
1st. As 12 : 13 :: 18 : 19½
For 18×13=234÷12=19½ in barter.
2nd. As 18*d.* : 1lb. :: 1200*s.* : 800lbs.
12
18)14400(800lbs. answer.
144
00

(13)

d. *d.* *d.*
1st. As. 10 : 12 :: 7½ Or.
half pen. *d.* half pen. *d.*
as 20 : 12 :: 15 : 9 in barter.

6*d.*	½	3610 at 7½*d.*
1½	¼	1805
		451 3
		2256 3

35*l.* × 20 = 700 0 deduct.
2nd, As 10*d.* : 1ell. 1556 3
12
1,0)1867,5
1867½ Ells answer.

(14)

s.	C.	*s.*	*d.*
1	½0	20 at 21	6
d.		1	
6	½	0 10	

L. 21 10 Value of A's
L. *s.*
8 pieces at 3 14
8
From *L.* 29 12 Value of B's
Take 21 10
A receives *L.* 8 2 answer.

(15) C. qr. *L.* *s.*
5 1 at 1 18
qr. 5
1	¼	9 10
		0 9 6

Val. of Tobac. *l.* 9 19 6

yds. *L.* *s.* *d.* yd.
Then, as 24 : 9 19 6 :: 1 Or, as
24yds. : 2394*d.* :: 1yd. : 99
12/24*d.* For 2394 ÷ 24 = 99½*d.* or
8*s.* 3*d.*½ answer.

(16)

yds. *s.* *d.*
40 at 7 4
5 × 8 = 40
1 16 8
8

Value of the cloth *L.* 14 13 4 continued.

Then, 28½lbs. at 11 6
4×7=28

½) 2 6 0
7
16 2 0
5 9
From 16 7 9 Value of the Tea,
Take 14 13 4
A pays *L.* 1 14 5 answer.

(17) 7½ C.wt.=840lbs. at 8*d.*
8
Then, as 12½C. : 6720*d.* :: 1lb. Or, as 1400lbs. : 6720*d.* :: 1lb. : 4¾*d.*+ For 6720÷1400=4$\frac{120}{140}$*d.* or 4¾*d.*+ answer.

(18) 20 C.wt. at 3*l.* Then, as 8*d.* : 1lb. : : 60*l.* Or, as 8*d.* : 1lb. : : 14400*d.* : 1792lbs.
3 or 16C. 8lb. answer.
L. 60

(19) *s.* *d.* *s.* *d.* *s.* *d.*
From 12 6 Then, as 2 6 : 10 : : 10 Or, as 30*d.* :
Take 10 0 10*s.* : : 10*d.* : 3*s.* 4*d.* answer.
s. 2 6

(20) 1st. As 2*l* 16*s.* : 3*l.* : : 5*s.* : 5*s.* 4¾*d.*
20 20
56 60×5=300 which÷56=5$\frac{5}{14}$ or 5 4$\frac{2}{7}$
s. *s.* *d.*
2nd. 12½C.wt.×3*l.*=37*l.* 10*s.* Val. of the Hops in Barter.

Gal. *s.* *d.* Gal. *L.* *s.* *d.*
3d. As 1 : 5 4¾ : : 63 4th. From 37 10 0
7 Take 16 17 6
1 17 6 answer. *L.* 20 12 6
9
L. 16 17 6

LOSS AND GAIN.

(2) 120×12=1440 & 20—17=3cts. loss on one knife.
Then say, as 1kni. : 3cts : : 1440kni. : 43,20cts. ans.

(3) 4*s* 9*d*—4*s*.=9*d*. gain on 4 shillings.
Then, as 4*s*. : 9*d*. :: 100*l*. : 4500*d*. or 18*l*. 15*s*. ans.

(4) 1st. 17*L*.×7T.×4hhds.=476*l*. Prime cost of the wine.
2nd. 7T.×4hhds.×63 gals.×8pt=14112 pts. in 7 Tons.
3d. 1411,2÷2,0=705*l* 12*s*. and 705*l* 12*s*.—476*l*.=229*l*. 12*s*. whole gain. 4th As 476*l*. : 229*l* 12*s*. :: 100*l*. : 48*l* 4*s* 8½*d*.+gain per cent.

(5) 149+51=200 dols. to be given for 100 yards. Then, as 100yd. : 200dols. :: 1yd. : 2dols. answer.

(6) 60×2=120 dols. Then, as 100 dols. : 4dol. :: 120 dols. : 4dol. 80ct. answer.

(7) First, 100*l*.—9*l*.=91*l*. and 500 knives ×15*d*.=7500*d*.
2nd. as 91*l*. : 100*l*. :: 7500*d*. : 8241¾*d*.

	d.	×100
3d. From	8241¾	
Take	7500	750000÷91=8241¾*d*.
Remains	741¾*d*. which÷12 and by 20=3	*L.* 1	*s.* 9¾	*d.* ans.

(8) First, 69*l*. ×14T. =966*l*. The first cost. 14T.×20C. ×4qr.×28lb.=31360lbs.
2nd. 6d. | ¾ | 31360lbs. at 6*d*.
2,0)1568,0
l. 784 sold for.
3d. From 966*l*. bought for,
Take 784 sold for.
answer. *l*. 182 loss.

(9) First 16*s*.—13*s* 4*d*.=2*s* 8*d*. gain per yard. Then, as 13*s* 4*d*. : 2*s* 8*d*. :: 100*l*. or, as 160*d*. : 32*d*. :: 100*l*. : 20*l*. For 32×100=3200 which÷160=20*l*. answer.

(10) 1C.wt.=112lb. at 11*d*. per lb.

L.	*s.*	*d.*	11
4	13	4=1120*d*. subt.	1232
			112*d*. gain.

Then, as 4*l*. 13*s* 4*d*. : 112*d*. :: 100*l*. Or, as 1120*d*. : 112*d*. :: 100*l*. : 10*l*. For 112×100 =1120,0 which÷112,0=10*l*. answer.

(11) 100+15=115 yds. Then, as 100 : 115 :: 56 : 64*l* 8*s*.
L. *L.* *L.*
L. *s.* yd.
2nd, as 100 : 64 8 :: 1
20
1,00)12,88
answer 12$\frac{88}{100}$*s*. or, 12*s* 10½*d*.+

(12) *L. s.*
12)5 14
0 9 6*d.*

L. *L.* *s.* *d.*
Then, as 108 : 100 :: 9 6 Or, as
108*l.* : 100*l.* :: 114*d.* : 105$\frac{5}{19}$*d.* +
For 114 × 100 = 11400 which ÷108*l.*
= 105$\frac{65}{108}$*d.* or 8*s* 9$\frac{1}{2}$*d.*+ answer.

(13) *L.* *L.* *L.* *L.* *s.* *d.*
Thus, 25–18=7 then, 18*l.* 4m. > 7*l.* < 100*l.* 12m. > 116 13 4 ans.

L. m. *L.* *L.* m: *L.* *s.* 6
For 100×12×7÷18×4=116$\frac{2}{3}$*l.* or 116 13 4 answer.

(14) d.
2|$\frac{1}{8}$| 300 lbs at 4*s* 2*d.*
4
1200
+50
20)1250
L. 62 10

Then, as 104$\frac{1}{4}$: 100*l.* :: 75*l.* :
72$\frac{12}{104}$*l.* For 75×100=7500
÷104=72*l* 2*s* 3$\frac{1}{2}$*d.* pres. worth
And 72*l* 2*s* 3$\frac{1}{2}$*d*—62*l* 10*s.*=9*l*
12*s.* 3*d*$\frac{1}{2}$. whole gain.

|5|$\frac{1}{2}$| 300lbs. at 5*s.* Again, As {62 10 mo. 8} *L.* 12 10 *s.* 100*l.* 12 > *L.* 30

L. 75 0
—62 10
L. 12 10

500

$\frac{1}{2}$)1200
× 12$\frac{1}{2}$*l.*
14400
+ 600
5,00)150,00*
L. 30 per cent.

m.
|6|$\frac{1}{2}$|
|2|$\frac{1}{2}$| 6*l.* per cent. for a year.
3
1
4.
+100
l. 104

L. *s.* *d.*
answer 9 12 3$\frac{1}{2}$ whole gain, and 30*l.* per ct.

(15) Thus, as 7*s.* : 110*l.* :: 8*s* 6*d.* Or, as 84*d.* : 110*l.* :: 102*d.* : 133$\frac{4}{7}$*l.* For 102 × 110=11220 which ÷84=133$\frac{4}{7}$*l.* or 133*l* 11*s* 5$\frac{1}{7}$*d.* Then, 133*l* 11*s* 5$\frac{1}{7}$*d.*—100*l.* =33*l* 11*s* 5$\frac{1}{7}$*d.* gained, answer.

(16) 370D. 10ct.—326dols.=44D. 10ct. gained on 490lbs.
Then as, 490lb. : 44D. 10ct. :: 1lb. : ,09ct. answer.

(17)

	L.	*s.*	*d.*
Thus.	6	10	0
	+ 1	0	10

Then, as 10,0 : 12,0 :: 7 10 10 = Prime cost : 9 1 ans.

12

10)90 10 0

L. 9 1 0 answer.

(18) Thus, From 28 at 4*l.* = 112*l.*

$$+\begin{cases} 10 \text{ at } 6l = 60 \\ 8 \text{ at } 5l = 40 \end{cases}$$

Take 18 = *L.* 100 Value of 18 pieces.

10 pieces.

Then, as 10,0*l.* : 11,0*l.* :: 112*l.*

11

1,0)123,2

From 123 4

Take 100 0

Value of the 10 rem. pieces = *l.* 23 4

Lastly, as 10pes. : 23*l* 4*s* :: 1pes. : 2*l* 6*s* 4$\frac{4}{5}$*d.*

(19) Thus, as 115*l.* : 100*l.* :: 11*s* 6*d.* Or, as 115*l.* : 100*l.* :: 138*d.* : 120*d.* = 10*s.*

s.	*s.*	*d.*
From 12	& 11	6
Take	10	— 10
s. 2		1*s* 6*d.*

Then, as

s.	*d.*	*l.*	*s.*
1	6 :	15*l.* : :	2
2		4	2
3		3)60	4

answer = 20*l.* per cent.

(20) Thus, as 7*s.* : 110*l.* :: 6*s.*

6

7)660

l. 94 5 8$\frac{4}{7}$

Then, From

l.	*s.*	*d.*
100	0	0
Take 94	5	8$\frac{4}{7}$
answer *l.* 5	14	3$\frac{3}{7}$ loss.

(21) 100*l.* at 1½*d.* in the shilling.

20

1½ | ½ | 2000

2,0) 25,0

answer *L.*12 10

(22)

	s.	*d.*
100 at	3	6
		10
	1 15	0
		10
answer. *l.*	17 10	0

(23) 10½+2=12½. As 12½*d.* : 2*d.* :: 100*l.* Or, as 25 half pen. : 4 half pen. :: 100*l.* : 16*l.* answer.

(24) 125*l.* : 100*l.* :: 28*s.*

100

2800÷125=22⅖*s.* first cost.

Then, as 22⅖*s.* : 112lb. :: 16*s.* : 80lbs.

5 80 5

112) 8960 80

lbs. 80 answer.

FELLOWSHIP.

CASE 1.

EXAMPLES.

(2)

	L.
A	1200
B	4800
C	2000
L.	8000 whole sum.

Then, as 8000 : 800 ::

L.	*L.*
1200	: 120
4800	: 480
2000	: 200

answer.

Proof 800*L.*

(3)

	T.
A	48
B	36
C	24
Tuns	108 whole stock.

Then, As 108 : 45 ::

T.	T.	
48	: 20	A's loss.
36	: 15	B's do.
24	: 10	C's do.

answer.

Tuns 45 Proof.

(4)

		L.	*s.*	*d.*	Dols.	
Thus;	S.	70	0	0	= 16800	S's in pence.
	T.	400	0	0	= 96000	T's do.
	V.	140	12	6	= 33750	V's do.

409*l* 14*s*. = 98328 pence. 146550 = whole sum in pence.

		d.	*d.*	*L.*	*d.*	*d.*	
Then, as		16880 :	11271$\frac{3}{4}$ +	= 46	19	3$\frac{3}{4}$ +	S's
146550*d.* : 98328*d.* : :		96000 :	64111$\frac{1}{4}$ +	= 268	7	7$\frac{1}{4}$ +	T's
		33750 :	22644$\frac{1}{2}$ +	= 94	7	0$\frac{1}{2}$ +	V's

(5)

		L.	*s.*	*d.*	
Thus;	A	742	12	0	= 178224 pence.
	B	641	19	8	= 154076
	C	987	19	9	= 237117

L.	*s.*	*d.*	
1400	14	6	= 336174*d.*

569417 = sum in pence.

		d.	*d.*	
Then, as		178224 :	105220$\frac{1}{4}$ +	A's share,
569417 : 336174 : :		154076 :	90963$\frac{3}{4}$ +	B's do.
		237117 :	139989$\frac{3}{4}$ +	C's do.

Lastly, Pence.

	L.	*s.*	*d.*		
105220$\frac{1}{4}$ ÷ 12 & by 20 =	438	8	4$\frac{1}{4}$ +	A's part.	answer.
90963$\frac{3}{4}$ ÷ 12 & by 20 =	379	0	3$\frac{3}{4}$ +	B's do.	
139989$\frac{3}{4}$ ÷ 12 & by 20 =	583	5	9$\frac{3}{4}$ +	C's do.	

L. 1400 14 6 Proof.

(6) A. R. P.

292 3 16 = 46856 perches.

	L.			*L.*	A.	R	P.	
A	60			60 :	87	3	17 =	A's share
B	65	then, as	200 : 46856 : :	65 :	95	0	28 =	B's
C	75			75 :	109	3	11 =	C's

answer.

l. 200

acres 292 3 16 Proof.

(7)

	A.			A.	*L.*	
P	90			90 :	60	P. pays.
Q	120	Acres.	As 360 : 240 : :	120 :	80	Q. do.
R	150			150 :	100	R. do.

answer.

360 acres

L. 240 Proof.

CASE 2.

EXAMPLES.

(2)

	L.	mo.		
First	400	× 9	= 3600	A's Stock and time.
	680	× 5	= 3400	B's do. do.
	120	× 12	= 1440	C's do. do.

8440 Sum.

Then, Sum.	*L.*	Sum.	*L.*	*s.*	*d.*	
As 8440	: 500 ::	3600	: 213	5	4½	+ A's
		3400	: 201	8	5	+ B's
		1440	: 85	6	1½	+ C's
						+ ½

answer.

Proof *L.* 500 0 0

(3)

Oxen.	days.	
40	× 76	= 3040
36	× 50	= 1800
50	× 90	= 4500

9340 Sum of Stock and time.

Then, Sum.	*L.*	*L.*	*s.*	*d.*	
as 9340	: 20 ::	3040	: 6	10	2¼ A pays.
		1800	: 3	17	1 B do.
		4500	: 9	12	8¾ C do.

answer.

Proof 20 0 0

(4) Thus; as 12mo. : 1800dols. : : 8 : 2700dols. Inverse.

12

21600 ÷ 8 = 2700 dols. answer.

(5)

	L.	mo.		*L.*	mo.
First	100	× 4 =	400	250	× 5 = 1250
	+ 150			+ 60	
	250	× 4 =	1000	310	× 5 = 1550
	− 30			+ 100	
	220	× 4 =	880	410	× 2 = 820

A's stock & time = 2280 B's stock & time = 3620

continued.

L.	mo.		
300 × 3 =	900		
—200			
100 × 4 =	400	2280	
—50		3620	+
50 × 5 =	250	1550	
		7450	Sum of stock & time.

C's stock & time 1550

Then. Sum. *L.* Sum. *L.* *s.* *d.*

As 7450 : 138 :: { 2280 : 40 14 0¾ + A gains. } answer.
{ 3620 : 64 12 6 + B do. }
{ 1550 : 27 13 5 + C do. }

(6)

L.	mo.	*L.*	mo.
First, 364 × 4 =	1456	408 × 7 =	2856
+40		—86	
404 × 8 =	3232	322 × 5 =	1610
A's stock & time =	4688	B's stock & time =	4466

148 × 3 = 444
+86
234 × 5 = 1170
+100
334 × 4 = 1336

{ 4688
{ 4466
{ 2950

12104 sum of their Stock & time

C's stock & time = 2950

Then, Sum *L.* *L.* *s.* *d.*

As 12104 : 1436 :: { 4688 : 556 3 6½ A's gain. } answer.
{ 4466 : 529 16 9½ B's do. }
{ 2950 : 349 19 8 C's do. }

(7)

	L.		*L.*	B & C	*L.*	
1st. A & B =	456	Then	631	—431 =	200	A's gain.
B & C =	431		631	—375 =	256	B's do.
C & A =	375		631	—456 =	175	C's do.
Num. combined =	2)1262					
Whole gain =	*L.* 631					

continued.

To find the value of B's cloth.

A's gain. B's gain.

Say inversely, thus; { As 200 mo. 12 ▶ A's stock 50 ◀ 256 mo. 8 ▶ 96*L.*

For 256*l.*×50*l.*×12mo.÷200*l.*×8mo.=96*l.* value of B's 160 yds. of cloth.

And 96*l* ×20=1920*s.* which÷160yds.=12*s.* per yard.

Again to find the price of C's wheat per bushel.

A's gain. C's gain.

Say inversely, { As 200 mo. 12 ▶ A's stock 50 ◀ 175 mo. 7 ▶ 75*l.*

For 175*l.*×50*l.*×12mo.÷200*l.*×7mo.=75*L.* Value of C's 240 bushels of Wheat. And 75*l.* ×20=1500*s.* which ÷240 bushels=6¼*s.* or 6*s.* 3*d.* per bushel. answer.

EXCHANGE.

CASE 1.

EXAMPLES.

(2) 750*l.*÷15=50*l.* and 750÷50=800*l.* answer.

(3)

	L.	*s.*	*d.*
15= 3	173	16	0
5	57	18	8
	11	11	8¾ +
answer *L.*	185	7	8¾ +

(4) 5)375

— 75

answer. *L.* 300

(5)

	L.	*s.*	*d.*
	76	17	8
	200	0	0
	170	10	11
	447	8	7
5)	— 89	9	8½
ans. *L.*	357	18	10½ +

d. *d.* *L.*

(6) Thus, as 90 : 56 : : 1500 : 933⅓*l.*

1500

L. *s.* *d.*

8400,0÷9,0=933 6 8*d.* answer.

(7) 4)240
—60

L. 180 answer.

(8) *L.* *s.* *d.*
2)562 13 8

6)281 6 10
+46 17 9½+

answer *L.* 328 4 7½

(9) *L.* *s.* *d.*
4)104 16 9
+26 4 2¼

answer *l.*131 0 11¼

(10) *L.*
3)180
+60

answer *L.* 240

(11) 9)360 From

40 }
40 } +

Take 80 = twice ⅛
answer *l.*280

(12) *d.* *d.* *L.*
Thus; as 56 : 90 :: 475 : 763 2/56 *l.*
For 475 × 90 & ÷ 56 = 763*l.* 7*s.*
10½*d.* + answer.

(13) *L.* *s.* *d.*
472 16 8
2

7)945 13 4
— 135 1 10⅔+

L. 810 11 5¼ answer.

(14) 280*L.*
2

7)560

80
+280

L. 360 answer.

(15) *L.* *s.* *d.*
96 16 9¾
2

7)193 13 7½
— 27 13 4½

L. 166 0 3 answer.

(16) *L.* *s.* *d.*
16 = 4)36791 14 4 From
4) 9197 18 7

Take 2299 9 7¾

L. 34492 4 8¼ ans.

CASE 2.

EXAMPLES.

(3)

		L.	s.	d.
25	$\frac{1}{2}$	1470	12	8
10	$\frac{1}{10}$	367	13	2
1	$\frac{1}{10}$	147	1	3
$\frac{1}{2}$	$\frac{1}{2}$	14	14	$1\frac{1}{2}$
		7	7	$0\frac{3}{4}$

answer *L.* 2007 8 $3\frac{1}{4}$

(4) As 112 : 100 :: 740 14 6

28 25

5×5

3703 12 6

5

28 = 4)18518 2 6

7) 4629 10 $7\frac{1}{2}$

answer *L.* 661 7 $1\frac{1}{2}$

(5)

		L.	s.	d.
L. 10 =	$\frac{1}{10}$	651	14	$11\frac{3}{4}$ at 12 per ct.
2 =	$\frac{1}{5}$	65	3	$5\frac{3}{4}$
		13	0	$8\frac{1}{4}$

answer *L.* 729 19 $1\frac{3}{4}$

(6)

		L.	s.	d.	
50	$\frac{1}{2}$	452	10	6	at $77\frac{1}{2}$ per cent.
25	$\frac{1}{2}$	226	5	3	
$2\frac{1}{2}$	$\frac{1}{10}$	113	2	$7\frac{1}{2}$	
		11	6	3	

answer *L.* 803 4 $7\frac{1}{2}$

(7)

		L.	s.	d.	
50	$\frac{1}{2}$	750	2	$4\frac{1}{2}$	at 78 per cent.
25	$\frac{1}{2}$	375	1	$2\frac{1}{4}$	
$2\frac{1}{2}$	$\frac{1}{20}$	187	10	7	
$\frac{1}{2}$	$\frac{1}{5}$	18	15	$0\frac{3}{4}$	
		3	15	0	

ans. *L.* 1335 4 $2\frac{1}{2}$

(8) Thus; 167*l* 10*s* : 100*l*. : : 1341*l* 9*s* $4\frac{3}{4}$*d*. Or, as 160800qrs. : 100*l*. : : 128781100qrs. : $800\frac{1411}{1608}$*l*. For 1287811 × 100 = 128781100 which ÷ 160800 = 800*l*. 17 $6\frac{1}{3}$ ans.

(9) Thus, as 144*l* : 100*l*. : : 260*l* 8*s* 6*d*. Or, as 34560*d*. : 100*l*. : : 62502 : $180\frac{240}{345}$*l*.

For 62502 × 100 = 6250200 which ÷ 34560 = 180*l*. 17*s*. ans.

(10)

	L.	s.	d.	
50	400	17	9	at 51½ per cent.
1	200	8	10½	
½	4	0	2+	
	2	0	1	
ans. *l.*	607	6	10½	

(11) Liv. *d.* Liv. sol. den. As 1 : 17½ : 4226 12 8 Or, as 240*d.* : 70qrs. :: 1014392*d.* : 295864qrs. and 295864÷4 by 12 & 20 = 308*l* 3*s* 10*d.* currency. Again, as 1 liv. : 10½*d.* :: 4226 liv. 12sol. 8den. Or, as 240*d.* : 42qrs. :: 1014392*d.* : 177518qrs. or 184*l* 18*s* 3½*d.* sterling.

(12) Liv.

3	½	49008 at 15*d.*
		+12252
2,0)		6126,0
L.		3063 currency.

again *L.* 3063 × 3 = 4)9189

L. 2297 5 sterling, answer.

(13)

	L.	*L.*	Flor.
Thus, as	104	100	4376
	6 Florins =	1*l.*	100
	624		

624)437600(701 1 13 13 answer. *L.* fl. sti. pen.

4368
800
624
176
6
1056
624
432
20
8640
624
2400 &c.

(14) Thus; as 1flo. : 35½*d.* :: 10235flo. 17stiv. 8pen. Or as 320pen. : 141qrs. :: 3275480pen : 1443258qrs. For 3275480×141 = 461842680 ÷ 320 = 1443258qrs. or 1503*l* 7*s* 10½*d.* currency.

Again, as 38*s* 6*d.* : 1*l.* :: 10235flo. 17stiv. 8pen. Or, as 3696pen. : 1*l.* :: 3275480pen. : 886*l* 4*s* 5½*d.* ster. ans.

(15) pezo. *s.* *d.* peso. rea. marv.
Thus; as 1 : 7 6 :: 2524 7 33
8 12 8
8 90 20199
54 34
272 686799×90=61811910 Then,
61811910÷272=227249½*d.*=946*l* 17*s* 5½*d.* Penn. curr.

(16) Thus, as 6*s.* : 1dol. :: 1743*l* 16*s.*
20
34876÷6=5812⅔dols. answ.

(17)
s. *d.*
*s.*5|d|½|1186 millr. 500 reas. at 7 6 per millrea.
L. *s.* *d.*
2|6|½|296 10 Then, 17)444 18 9
148 5
3 9=500 reas. ans. *L.* 26 3 5½ per pipe
L. 444 18 9 value of 17 pipes.

(18) *s.* *d.* *L.* G. sti.
Thus; as 35 6 : 1 :: 2714 15
6+3 sti. 20
L. *s.* *d.*
213 213)54295(254 18 1½+answer.

(19) Thus; as 1*l.* : 33*s* 10*d.* :: 290*l* 11*s* 10*d.* Or, as 240*d.* : 406*d.* :: 69742*d.* : 117980*d.* or 491*l* 11*s* 8*d.* Then; as 100*l.* : 117980*d.* :: 104*l* 10*s.* Or, as 2000*s.* : 117980*d.* :: 2090*s.* : 123289*d.* + and 123289 ÷ 12 & 20=513*l* 14*s* 1*d.* answer.

(20) Thus, as 47½*d.* : 1pezo. :: 1710*l* 16*s* 4*d.* Or, as 95half pen. : 1pez. :: 821192 half pen. : 8644pezo.+ For 821192÷95=8644+pezos. answer.

(21) Thus; as 64 : 1milre : : 1566*l* 6 8
20
31326
12
64)375920(5873millr.750reas. ans.

(22) Thus, as 34*s*. 4*d*. : 1*l*. : : 564*l* 10*s* 6*d*.

12 20

412 11290

12

412)135486(328*l* 16 11¾ answer.

(23) Thus, as 4,00 reas. : 52*d*. : : 10,00 reas.

10

4)520

Then, as 34*s* 4*d*. : 1*l*. : : 130*d*. : 75¾*d*. nearly answer.

(24) 1200Cr.÷½=600 and 600÷100=6Cr. the commission.

From 1200 Then as 55*d*. : 56*d*. : : 1194Cr. : 1215½+Cr.

Take 6 and 1215½+Cr.—1200Cr.=15½+Cr.

A gains. answer.

1194

REDUCTION OF VULGAR FRACTIONS.

CASE 1.

EXAMPLES.

(2) 2)$\frac{72}{94}$=$\frac{36}{47}$ ans. (3) 2)$\frac{84}{170}$=$\frac{42}{85}$ ans. (4) 5)$\frac{60}{185}$=$\frac{12}{37}$ ans.

(5) com. meas.

2)$\frac{188}{196}$=7)$\frac{94}{98}$=$\frac{13}{14}$ ans. (6) 9876)$\frac{9876}{888884}$(9 9876) $\frac{9876}{888884}$=$\frac{1}{9}$ ans.

CASE 2.

EXAMPLES.

(2) $\frac{6}{10}$=$\frac{3}{5}$, $\frac{4}{8}$=$\frac{1}{2}$, $\frac{1}{3}$, $\frac{6}{7}$,

The fractions in their lowest terms are

$\frac{3}{5}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{6}{7}$, Then,

3×2×9×7=378
1×5×9×7=315
1×5×2×7= 70
6×5×2×9=540

} numera.

5×2×9×7=630 com. deno.

Facit $\frac{378}{630}$, $\frac{315}{630}$, $\frac{70}{630}$, & $\frac{540}{630}$.

(3) $\frac{4}{9}$, $\frac{7}{11}$, $\frac{5}{7}$ and $\frac{1}{2}$,

4×11× 7×2= 616
7× 9× 7×2= 882
6× 9×11×2=1188
1× 9×11×7= 693

} Numerators.

9×11×7×2=1386 com deno.

Fac. $\frac{616}{1386}$, $\frac{882}{1386}$, $\frac{1188}{1386}$, & $\frac{693}{1386}$

(4) $\frac{6}{9}=\frac{2}{3}$, $\frac{3}{7}$, $\frac{1}{3}$ and $\frac{7}{8}$
The fractions in their lowest terms
Are $\frac{2}{3}$, $\frac{3}{7}$, $\frac{1}{3}$, and $\frac{7}{8}$
Fac. $\frac{336}{504}$, $\frac{144}{504}$, $\frac{168}{504}$, & $\frac{441}{504}$

Then, $2\times7\times3\times8=336$
$2\times3\times3\times8=144$ } numerator.
$1\times3\times7\times8=168$
$7\times3\times7\times3=441$
$3\times7\times3\times8=504$ co. deno.

(5) $\frac{4}{5}$, $\frac{1}{2}$, $\frac{5}{6}$, and $\frac{3}{8}=\frac{1}{4}$
The fractions are $\frac{4}{5}$, $\frac{1}{2}$, $\frac{5}{6}$ & $\frac{1}{4}$

Fac. $\frac{192}{240}$, $\frac{120}{240}$, $\frac{200}{240}$ and $\frac{60}{240}$

Then, $4\times2\times6\times4=192$
$1\times5\times6\times4=120$ } numerator.
$5\times5\times2\times4=200$
$1\times5\times2\times6=60$
$5\times2\times6\times4=240$ co. deno.

CASE 3.

EXAMPLES.

(2) $19\times18+12=\frac{354}{18}$ ans. (3) $16\times100+18=\frac{1618}{100}$ ans.
(4) $100\times59+19=\frac{5919}{59}$ ans. (5) $514\times16+5=\frac{8229}{16}$ ans.
(6) $47\times8400+3141=\frac{397941}{8400}$ ans.

CASE 4.

EXAMPLES.

(2) $\frac{141}{17}$) 141 (8$\frac{5}{17}$ Facit.
136
5
17

(3) $\frac{126}{48}$) 126 (2$\frac{30}{48}$ Facit.
96
30
48

(4) $\frac{961}{17}$) 961 (56$\frac{9}{17}$ Facit.
85
111
102
9
17

(5) $\frac{13}{7}$) 13 (1$\frac{6}{7}$ Facit.
7
6
7

(6) $\frac{38488}{21}$) 3848 (183$\frac{5}{21}$ Facit.
21
174
168
68
63
remainder 5

CASE 5.

EXAMPLES.

(2) $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4} = \frac{1\times2\times3}{2\times3\times4} = \frac{6}{24} = \frac{1}{4}$ Facit.

(3) $\frac{7}{8}$ of $\frac{4}{6}$ of $\frac{9}{10} = \frac{7\times4\times9}{8\times6\times10} = \frac{252}{480} = \frac{21}{40}$ Facit.

(4) $\frac{12}{14}$ of $\frac{5}{6}$ of $\frac{1}{2} = \frac{12\times5\times1}{14\times6\times2} = \frac{60}{168} = \frac{5}{14}$ Facit.

(5) $\frac{5}{9}$ of $\frac{4}{8}$ of $\frac{3}{4} = \frac{5\times4\times3}{9\times8\times4} = \frac{60}{288} = \frac{5}{24}$ Facit.

(6) $\frac{1}{2}$ of $\frac{8}{9}$ of $\frac{6}{7} = \frac{1\times8\times6}{2\times9\times7} = \frac{48}{126} = \frac{8}{21}$ Facit.

CASE 6.

EXAMPLES.

(2) $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{12} = \frac{1\times1\times1}{2\times4\times12} = \frac{1}{96}$ s. Facit.

(3) $\frac{8}{9}$ of $\frac{1}{12} = \frac{8\times1}{9\times12} = \frac{8}{108} = \frac{2}{27}$ lb. Facit.

(4) $\frac{6}{7}$ of $\frac{1}{28}$ of $\frac{1}{4} = \frac{\times1\times1}{7\times28\times4} = \frac{6}{784} = \frac{3}{392}$ c.wt. Facit.

(5) $\frac{9}{13}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{1}{63} = \frac{9\times1\times1\times1}{13\times2\times\times643} = \frac{9}{6552} = \frac{3}{728}$ hhd. Fac.

(6) $\frac{10}{11}$ of $\frac{1}{60}$ of $\frac{1}{24} = \frac{10\times1\times1}{11\times60\times24} = \frac{10}{15840} = \frac{1}{1584}$ day. Facit.

CASE 7.

EXAMPLES.

(2) $\frac{1\times12\times4}{96} = \frac{48}{96} = \frac{1}{2}$ qr. Facit.

(3) $\frac{2\times12}{27} = \frac{24}{27} = \frac{8}{9}$ oz. Facit.

(4) $\frac{3\times4\times28}{392} = \frac{336}{392} = \frac{6}{7}$ lb. Facit.

(5) $\frac{1\times63\times4\times2}{728} = \frac{504}{728} = \frac{9}{13}$ pt. Facit.

(6) $\frac{1\times24\times60}{1584} = \frac{1440}{1584} = \frac{10}{11}$ min. Facit.

CASE 8.

EXAMPLES.

(2) $\frac{18 \times 12}{43} = \frac{216}{43} = 5\frac{1}{43}$ Facit.

(3)

	L.	*s.*
$\frac{4}{7}$ of 5	9	
	6	
7)	32	14
Facit *L.*	4	13 $5\frac{7}{7}$

(4) $\frac{12}{16}$ of lb. = 12 oz.

12

16)144(9 oz. Facit
144

(5)

	C.	qr.	lb.
$\frac{9}{11}$ of 10	1		12
			9
11)	93	0	24
Fac. c. wt.	8	1qr.	25lb. 1oz. 7 $\frac{3}{11}$dr.

(6) $\frac{4}{7}$ of 8 fur. = 1 mile.

4

7)32

Fur. 4 125yds. 2ft. 1in. $2\frac{1}{7}$ b. c.

(7) $\frac{4}{5}$ of $\frac{5}{1} = \frac{20}{5} = 4$qrs. = 1yd. Fac.

(8) $\frac{6}{7}$ of $\frac{4}{1} = \frac{24}{7)24}$

Facit 3qrs. $1\frac{4}{7}$na.

(9) 5

4 R. P.

19)20(1 $2\frac{2}{19}$
19
1
×40
19)40(2
38
rem. 2

(10) $\frac{3}{10}$ of $\frac{24}{1} = \frac{72}{10)72}$ hr. min.
70
2
×60
10)120
12 min.

(11) $\frac{1}{8}$ of 7*s.* 6*d.*

12

8)90

Facit $11\frac{1}{4}$*d.*

(12) $\frac{1}{12}$ of 100*d.*

1

12)100

Facit $8\frac{1}{3}$*d.*

(13) $\frac{2}{3}$ of 21*s.* $\frac{2}{9}$ of 35*s.*

2 2

9)42 9)70

Facit *s.* 4 8 ster. 7 $9\frac{1}{3}$ Penn. curr.

(14) L. s. — $\frac{4}{5}$ of 1 7 = a moidore. — L. s. — $\frac{4}{5}$ of 2 5s. = moidore.

4 — 4

5)5 8 — 5)9 0

Facit L. 1 1 $7\frac{1}{5}$ ster. — Facit L. 1 16s. Penn. curr.

CASE 9.

EXAMPLES.

(2) $\frac{43\times5+1}{43\times12} = \frac{216}{516} = \frac{18}{43}$s. Facit. (3) $\frac{9}{12} = \frac{3}{4}$lb. Fac.

(4)

L.	s.		L.	s.	d.
5	9	and	4	13	$5\frac{1}{7}$
20			20		
109			93		
12			12		
1308			1121		
7			7		
9156			7848		

Then measure 1308)$\frac{7848}{9156} = \frac{6}{7}$ Fac.

(5)

C.	qr.	lb.	oz.	dr.
3	0	8	9	$13\frac{7}{13}$
4				
12				
28				
344				
16				
5513				
16				
88221				
13				
1146880				

20 C. = 1 Ton.

4				
80				
28				
2240				
16				
35840				
16				
573440				
13				
7454720				

Then com. mea. 573440)$\frac{1146880}{7454720} = \frac{2}{13}$ Facit.

(6)

Ft	in.	b.c.	
2	8	$1\frac{1}{5}$	a yard = 3ft.
12			12
32			36
3			3
97			108
5			5
486			540

Then common measure 54)$\frac{486}{540} = \frac{9}{10}$yd. Facit.

(7) A yard $=4$qrs. Facit $\frac{4}{5}$ ell.
An ell Eng. $=5$qrs.

(8) $\left.\begin{array}{l}3\text{qrs.}\times 4+2\text{na.}\\ 4\text{qrs.}\times 4\end{array}\right\} = \frac{14}{16}=\frac{7}{8}$yds. Facit.

(9) $\left.\begin{array}{l}1\text{R.}\times 40+30\text{P.}\\ 4\text{R.}\times 40\end{array}\right\} = \frac{70}{160}=\frac{7}{16}$ acres Facit.

(10) 13hr.$\times 60+30$min. $=810$
24 $\times 60$ $=1440=\frac{9}{16}$day.

CASE 10.

EXAMPLES.

(2) Thus; As $7 : 0 :: 42 : 48$ Facit $\frac{42}{48}$.

$$\frac{8}{336\div 7=48}$$

(3) Thus; As $3 : 4 :: 34 : 45\frac{1}{3}$ Facit $\frac{34}{45\frac{1}{3}}$

$$\frac{4}{136\div 3=45\frac{1}{3}}$$

(4) Thus; As $5 : 9 :: 73 : 131\frac{2}{5}$ Facit $\frac{73}{131\frac{2}{5}}$

$$\frac{9}{657\div 5=131\frac{2}{5}\text{ denominator.}}$$

CASE 11.

EXAMPLES.

(2) Thus; As $8 : 7 :: 49 : 42\frac{7}{8}$ Facit $\frac{42\frac{7}{8}}{49}$

$$\frac{7}{343\div 8=42\frac{7}{8}\text{ numerator.}}$$

(3) Thus; As $4 : 3 :: 46 : 34\frac{1}{2}$ Facit $\frac{34\frac{1}{2}}{46}$

$$\frac{3}{138\div 4=34\frac{1}{2}\text{ numerator.}}$$

(4) Thus: As $9 : 5 :: 131\frac{2}{5} : 73$ Facit $\frac{73}{131\frac{2}{5}}$

$$\frac{5}{45} \qquad \frac{5}{657}$$

$$\frac{5}{3285\div 45=73\text{ numerator.}}$$

CASE 12.

EXAMPLES.

(3) Thus; $34\times2+1=23$) $\frac{23}{46}=\frac{1}{2}$ Facit.
$46\times2=$

(4) Thus; $34\times3=34$) $\frac{102}{136}=\frac{3}{4}$ Facit.
$45\times3+1=$

(5) Thus; $17\times9+4=$ $\frac{157}{387}$ Facit.
$43\times9=$

(6) Thus; $7\times5=7$) $\frac{35}{98}=\frac{5}{14}$ Facit.
$13\times5+3=$

ADDITION OF VULGAR FRACTIONS.

EXAMPLES.

(2) 3) $\frac{7}{10}, \frac{11}{12}, \frac{4}{5}$ and $3\times2\times5\times2\times3=180$ least com. denom.
2) 10, 4, 8, then, $180\div10\&\times7=126$
$180\div12\&\times11=165$ } numerators.
5, 2, 3 $180\div9\&\times4=80$

com. denom. $=180$) 371 ($2\frac{11}{180}$ Facit.

(3) $\frac{1}{2}$ of $\frac{2}{3}=\frac{2}{6}=\frac{1}{3}$ Then, $19+7+\frac{1}{3}=26\frac{1}{3}$ Facit.

(4) $\frac{2}{4}$ of $\frac{7}{8}=\frac{14}{32}=\frac{7}{16}$ and $\frac{4}{6}$ of $\frac{19}{20}=\frac{76}{120}=\frac{19}{30}$
Then $7\times30=210$
$19\times16=304$
514 And $514\div480=1\frac{34}{480}$, or, $1\frac{17}{240}$ Facit.
$16\times30=480$

(5) $\frac{1}{5}$ of $\frac{95}{1}=\frac{95}{5}$ Then $95\times4=380$
And $\frac{7}{8}$ of $\frac{14}{1}=\frac{98}{8}=\frac{49}{4}$ $49\times3=147$
The fractions are $\frac{95}{5}$ & $\frac{49}{4}$
527
$3\times4=12$ $=43\frac{11}{12}$ Facit.

(6) $\frac{2}{3}$ and $\frac{1}{2}$
$2\times2=4$
$1\times3=3$
7
$=1\frac{1}{6}$
$3\times2=6$
Then $17+1\frac{1}{6}=18\frac{1}{6}$ Facit.

(7) $\frac{1}{3}, \frac{2}{3}$ and $\frac{3}{4}$
$1\times3\times4=12$
$2\times2\times4=16$
$3\times2\times3=18$
46
$=1\frac{1}{12}$
$2\times3\times4=24$
Then $12+3+4+1\frac{1}{12}=20\frac{1}{12}$ Fac.

(8) $\frac{7}{8}$ of $\frac{9}{10}=\frac{63}{80}$ and $\frac{4}{7}$ of $\frac{1}{2}=\frac{4}{14}=\frac{2}{7}$
The fractions are $\frac{63}{80}$, $\frac{2}{7}$ & $\frac{1}{2}$

Then $63\times 7\times 2=882$
$2\times 80\times 2=320$
$1\times 80\times 7=560$
1762
$80\times 7\times 2=1120=1\frac{642}{1120}$

Then $6+7+1\frac{642}{1120}=14\frac{642}{1120}$ Facit.

(9) $\frac{4}{5}$ of $\frac{3}{4}=\frac{4}{15}$, Then the fractions are $\frac{3}{5}$, $\frac{4}{15}$ and $\frac{5}{20}$,
$3\times 15\times 20=900$
$4\times 5\times 20=400$
$3\times 5\times 15=225$
1525
$5\times 15\times 20=1500=1\frac{1}{60}$

Then $9+1\frac{1}{60}=10\frac{1}{60}$ Facit.

(10) $\frac{1}{5}$ *L.* 1*L.*

20)20

2 2 $\frac{1}{2}$, $\frac{2}{3}$
+0 0 $\frac{3}{4}$
L. 2 3 $\frac{1}{2}$, $\frac{2}{3}$

(11) $\frac{7}{8}$ *L.* and $\frac{3}{4}$*s.*

Thus, $7\times 20\div 8=17$ 6
$3\times 12\div 4=0$ 9
Facit *s.* 18 3

(12) $\frac{7}{12}$ of $\frac{1}{12}=\frac{7}{144}$
the fractions are $\frac{7}{144}$lb. $\frac{1}{2}$lb.
$7\times 2=14$
$1\times 144=144$
158
$144\times 2=288$

And oz.dwt.gr.
$158\times 12\div 288=6$ 11 16 Fac.

(13) Thus, $\frac{4}{7}$ T. and $\frac{9}{10}$C.

4		9
×20		×4
7)80(11C.		10)36
77		
3		qrs. 3–6
×4		×28
7)12(1qr.		10)168
7		
5		lbs. 16–8
×28		×16
7)140		10)128
20 lbs.		oz. 12–8
		×16
		10)128

(14) $\frac{3}{4}$M. and $\frac{7}{10}$ fur. $=\frac{7}{40}$M.
$3\times 80=240$
$7\times 4=28$
268
$4\times 80=320$

and $268\times 8\div 320=6\frac{224}{320}$ fur.
or, 6fur. 28P. Facit.

continued,

(13) continued, C. qr. lb. oz.

	0	3	16	12	$12\frac{4}{5}$drs.
	11	1	20	0	0
Facit	12	1	8	12	$12\frac{4}{5}$ drs.

(15) $\frac{1}{3}$yd. and $\frac{2}{3}$ft.

ft. in.

$1\times 3\div 2 = 1\frac{1}{2}$ft. $= 1\ 6$

$2\times 12\div 3 = \ 0\ 8$

Facit 2 2

(16) $\frac{1}{4}$day and $\frac{1}{3}$hr.

hr. min.

Thus, $1\times 24\div 3 = 8\ 0$

$1\times 60\div 2 = 0\ 30$

Facit 8 30

(17) $\frac{1}{3}$ W. $\frac{1}{4}$d. $\frac{1}{3}$hr.

d. d. hr.

Thus, $1\times 7\div 3 = 2\frac{1}{3} = 2\ 8$

$1\times 24\div 4 = \ 0\ 6$

$\frac{1}{3}$ hour $= \ 0\frac{1}{2}$

Facit days 2 $14\frac{1}{2}$

(18) $\frac{2}{3}$yd. $\frac{3}{4}$ft. and $\frac{1}{7}$mile.

yd. ft. in.

Thus, $2\times 3\div 3 = 0\ 2\ 0$

$3\times 12\div 4 = 0\ 0\ 9$

$7\times 1760\div 8 = 1540\ 0\ 0$

Facit yds. 1540 2 9

(19) $\frac{1}{7}L.$ $1\times 20\div 7 = 2\frac{6}{7}s.$ $= 2\ 10\frac{1}{2}, \frac{1}{7}$ 3(21C.D.

$\frac{2}{5}s.$ $2\times 12\div 9 =$ $0\ 2\frac{2}{3}, \frac{2}{5}$ 14

$\frac{5}{12}d.$ $5\times 4\div 12 =$ $0\ 0\frac{1}{2}, \frac{5}{8}$ 14

Facit $s.$ 3 $1\frac{1}{2}$, $\frac{10}{21}$

(20) $\frac{2}{7}$ of $\frac{1}{1}L. = \frac{2}{7}L.$ $3\frac{1}{2}L. = 3\times 7+3 = \frac{24}{7}L.$

$\frac{1}{3}$ of $\frac{5}{7}$ of $\frac{3}{2} = \frac{15}{42} = \frac{1}{14}L.$ $\frac{2}{3}$ of $\frac{3}{7}$ of $\frac{1}{20} = \frac{6}{420} = \frac{1}{70}L.$

Then the fractions are $\frac{30}{7}L.$ $\frac{24}{7}L.$ $\frac{1}{7}L.$ and $\frac{1}{70}L.$ Therefore,

$30\times 7\times 7\times 70 = 102900$

$24\times 7\times 7\times 70 = 82320$

$1\times 7\times 7\times 70 = 3430$

$1\times 7\times 7\times 7 = 343$

188993

$= 7\frac{2093}{4010}L.$ or, $L.7\ 17\ 5\ 0$qr. $\frac{4}{7}$qr. Fa.

$7\times 7\times 7\times 70 = 24010$

(21) $\frac{2}{5}$ of $\frac{12}{7} = \frac{24}{5}L.$

$4\frac{3}{7}L. = \frac{31}{7}L.$

$\frac{1}{5}$ of $\frac{9}{10} = \frac{9}{50}L.$

$\frac{5}{8}$ of $\frac{1}{8}$ of $\frac{1}{50} = \frac{1}{400}L.$

The fractions are

$\frac{24}{5}$, $\frac{31}{7}$, $\frac{9}{50}$ and $\frac{1}{400}L.$

Then, $24\times 7\times 50\times 40 = 336000$

$31\times 5\times 50\times 40 = 310000$

$9\times 5\times 7\times 40 = 12600$

$1\times 5\times 7\times 50 = 1750$

660350

$5\times 7\times 50\times 40 = 70000$

And $660350\div 70000 = 9\frac{30350}{70000}L. = 9l\ 8s\ 8d.$ 0qr. $\frac{9}{28}$qr. Fac.

(22) $\frac{5}{8}+\frac{5}{16}$ Then, as 16pt. : 1500*l.* :: 14parts : 10311*l.*

$3\times16=48$ 14

$5\times8=40$

16)16500(1031*l.* 5*s.* Facit.

88 16

$=\frac{11}{16}$ A's part. 5 &c.

$8\times16=128$

SUBTRACTION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{97}{100}-\frac{3}{7}$

$97\times7=679$

$100\times3=300$ deduct.

remains 379

$100\times7=700$ Facit.

(3) $1\times7=7$ } numer- then, $96\frac{7}{21}$

$3\times3=9$ } rator. $-14\frac{9}{21}$

$3\times7=21$ com. deno. $81\frac{19}{21}$ Fa.

(4) Thus, from 96 take $0\frac{3}{5}$

Facit $95\frac{2}{5}$

(5) $\frac{3}{9}$ of $\frac{76}{1}=\frac{228}{9}=25\frac{1}{3}\cdot\cdot 4$ (12 co. den.

$\frac{9}{12}$ of $\frac{21}{1}=\frac{189}{12}=15\frac{3}{4}\cdot\cdot 9$

Facit $9\frac{7}{12}$

(6) $\frac{1}{2}$ of $\frac{2}{5}$ of $\frac{2}{4}=\frac{1}{4}$ then;

$\frac{109}{110}\times\frac{1}{4}$

$\frac{436}{440}-\frac{110}{440}=\frac{326}{440}=\frac{163}{220}$ Facit.

(8) $\frac{2}{3}$ of $\frac{19}{1}=\frac{38}{3}=12\frac{2}{3}$

Then, From $14\frac{1}{4}\cdot\cdot 3$ (12C.D.

$12\frac{2}{3}$ 8

remains $1\frac{7}{12}$

(7) $\frac{1}{2}\times\frac{17}{19}$

$\frac{19}{38}\cdot\frac{34}{38}$

Then, $71\frac{19}{36}-\frac{34}{36}=70\frac{13}{36}$ rem.

(9) $\frac{1}{3}l.=1\times20\div2=10s$ 0*d.*

$\frac{3}{4}s.=1\times12\div4=$ 0 9

Facit *s.* 9 3

(10) $\frac{1}{2}s.=1\times12\div2=6d.$

$-0\frac{3}{4}$

Facit *d.* $5\frac{1}{4}$

(11) $\frac{7}{8}$ of $\frac{1}{20}=\frac{7}{160}$ oz.

$\frac{3}{5}\times\frac{7}{160}$

$\frac{489}{800}-\frac{315}{800}=\frac{445}{800}$ oz.

And $445\times20\div800=11\frac{1}{8}$ dwt.

$=11$dwt. 3gr.

(12) $\frac{7}{12}$ of $\frac{1}{28}$ of $\frac{1}{4}=\frac{7}{1344}$C.

Then $\frac{1}{2}\times\frac{7}{1344}$ And

$\frac{1344}{2688}-\frac{14}{2688}=\frac{1330}{2688}$ C.wt. Or,

1qr. 27lb. 6 oz. $10\frac{2}{3}$drs. Facit.

(13) $\frac{7}{10}$ of $\frac{1}{3}=\frac{7}{30}$ leagues.

Then $\frac{2}{3}\times\frac{7}{30}$

$\frac{60}{90}-\frac{21}{90}=\frac{39}{90}$ leagues.

And $39\times3\div90=1$M.

2 fur. 16 perc. answer.

(14) $\frac{7}{10}$ of $\frac{1}{2} = \frac{7}{20}$ E.E.
1E.E. = 1yd. 1qr. 0na.
$7 \times 5 \times 4 \div 50 = 0 \quad 2\frac{4}{5}$
Facit yd. 1 0 $1\frac{1}{5}$

(15) $7)9\frac{7}{10}d.$
$1\frac{37}{70}$ week.
&$27 \times 7 \div 70 = 2$da. 16hr. 48m.
Then from 7w. 0d. 0hr. 0min.
take 1 2 16 48
Facit w. 5 4 7 12

(16) First, $\frac{1}{2} \times \frac{1}{18}$
$\frac{18}{36} - \frac{6}{36} = \frac{12}{36} = \frac{1}{3}$
Then, from 4da. $7\frac{1}{3}$hr.
take 1 9
Facit days 2 $22\frac{1}{3}$

(17) $5\frac{3}{8} = \frac{43}{8}L.$
And $\frac{3}{7}$ of $4\frac{1}{6} = \frac{3}{7}$ of $\frac{25}{6} = \frac{50}{42} = \frac{25}{21}l.$
Then $\frac{43}{8} \times \frac{25}{21}$
$\frac{903}{168} - \frac{200}{168} = \frac{703}{168} = L.$ 4 3 $8\frac{4}{7}$ & $\frac{1}{7}$ answer.

(18) $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{1}{20} = \frac{6}{240} = \frac{1}{40}L.$
Then $\frac{5}{8} \times \frac{1}{40}$
$\frac{200}{360} - \frac{9}{360} = \frac{191}{360}L.$ And
$191 \times 20 \div 360 = 10s.\ 7\frac{1}{2}d.\frac{1}{3}$ answer.

Or thus;
5
20
9)100
From s. 11 $1\frac{1}{2}$, $\frac{1}{3}$
$-\frac{2}{3}$ of $\frac{3}{4}s. = 0 \quad 6$
answer s. 10 $7\frac{1}{2}$, $\frac{1}{3}$

(19) $\frac{3}{5}$ of $\frac{1}{20} = \frac{3}{100}L.$ and $\frac{2}{7}$ of $5\frac{1}{2} = \frac{2}{7}$ of $\frac{31}{5} = \frac{62}{35} = \frac{31}{21}L.$
$\frac{31}{21} \times \frac{3}{100}$
$\frac{3100}{2100} - \frac{63}{2100} = \frac{3037}{2100} = 1\frac{937}{2100}L.$ or $1l\ 8s\ 11\frac{8}{35}d.$ answer.

(20) $\frac{2}{3}$ of $\frac{5}{6} = \frac{10}{24} = \frac{5}{12}$ parts.
Then, $\frac{5}{6} \times \frac{5}{12}$
$\frac{60}{96} - \frac{40}{96} = \frac{20}{96} = \frac{5}{24}$ parts.

pts. *L.* pts.
Then, as, 24 : 900 :: 5
5
24)4500(187*l.* 10*s.* answer.
24
210
192
180
168
$12 \quad \frac{12}{24}L. = 10s.$

MULTIPLICATION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{4}{8}\times\frac{7}{9}=\frac{28}{72}=\frac{7}{18}$ Facit. (3) $\frac{1}{3}$ of $\frac{4}{5}=\frac{4}{15}$ & $\frac{7}{10}$ of $\frac{11}{12}=\frac{77}{120}$ Then, $\frac{4}{15}\times\frac{77}{120}=\frac{308}{1800}=\frac{77}{450}$ Facit.

(4) $7\frac{1}{4}=\frac{29}{4}$
$8\frac{1}{2}=\frac{17}{2}$

(5) $4\frac{1}{2}=\frac{9}{2}\times\frac{1}{8}=\frac{9}{16}$ Facit.

$\frac{29}{4}\times\frac{17}{2}=\frac{493}{8}=61\frac{5}{8}$ Facit.

(6) $13\frac{9}{10}=\frac{139}{10}$ & $\frac{7}{8}\times\frac{139}{10}=\frac{973}{80}=12\frac{13}{80}$ Facit.

(7) $\frac{1}{2}$ or $\frac{7}{1}=\frac{7}{2}$ & $\frac{7}{2}\times\frac{3}{6}=\frac{21}{12}=1\frac{3}{4}$ Facit.

(8) $\frac{3}{5}$ of $\frac{8}{1}=\frac{24}{5}$ & $\frac{7}{8}$ of $\frac{5}{1}=\frac{35}{8}$ Then, $\frac{24}{5}\times\frac{35}{8}=\frac{840}{40}=21$ facit.

(9) $\frac{4}{9}$ of $\frac{11}{1}=\frac{44}{9}$ Then, $\frac{3}{6}\times\frac{44}{9}=\frac{132}{54}=2\frac{4}{9}$ Facit.

(10) $\frac{4}{5}$ of $\frac{91}{1}=\frac{364}{5}$ & $7\frac{1}{2}=\frac{143}{2}$ then $\frac{364}{5}\times\frac{143}{2}=\frac{52052}{10}=5205\frac{1}{5}$

(11) $12\frac{3}{5}=\frac{63}{5}$ & $\frac{1}{3}$ of $\frac{7}{1}=\frac{7}{3}$ then $\frac{63}{5}\times\frac{7}{3}=\frac{441}{15}=29\frac{6}{15}$ Facit.

(12) $7\frac{1}{2}=\frac{15}{2}$ & $9\frac{1}{4}=\frac{37}{4}$ then $\frac{15}{2}\times\frac{37}{4}=\frac{555}{8}=69\frac{3}{8}$ Facit.

(13) $\frac{2}{9}$ of $\frac{3}{5}=\frac{6}{45}$ & $\frac{5}{8}$ of $3\frac{3}{7}=\frac{115}{56}$ then $\frac{6}{45}\times\frac{115}{56}=\frac{690}{2520}=\frac{23}{84}$ fa.

(14) Thus; $\frac{2}{7}$ of $\frac{3}{5}=\frac{6}{35}$ & $4\frac{1}{6}=\frac{25}{6}$ Then,

$\frac{5}{1}\times\frac{2}{3}\times\frac{6}{35}\times\frac{25}{6}=\frac{1500}{630}=2\frac{9}{21}$ answer.

(15) Thus; $3\frac{1}{4}=\frac{13}{4}$ & $\frac{3}{4}$ of $\frac{3}{5}=\frac{9}{20}$ Then,

$\frac{2}{3}\times\frac{13}{4}\times\frac{5}{1}\times\frac{9}{20}=\frac{1170}{240}=4\frac{7}{8}$ answer.

(16) Thus; $3\frac{2}{3}=\frac{11}{3}$ & $\frac{3}{5}$ of $\frac{1}{4}=\frac{9}{20}$ Then,

$\frac{11}{3}\times\frac{1}{7}\times\frac{9}{20}=\frac{99}{420}=\frac{33}{140}$ answer.

DIVISION OF VULGAR FRACTIONS.

EXAMPLES.

(2) $\frac{13}{15}\times\frac{7}{9}$ Facit $\frac{117}{135}$ (3) $\frac{14}{18}\times\frac{7}{10}$ Facit. $\frac{140}{126}=1\frac{1}{9}$ (4) $\frac{1\frac{1}{2}}{2}$ $\frac{4\frac{8}{10}}{10}$ $\frac{3}{2}\times\frac{48}{10}$ $\frac{30}{90}=\frac{5}{16}$ Facit.

(5) $\frac{7}{8}\times\frac{4}{1}$ Facit $\frac{7}{32}$ (6) $\frac{4}{1}\times\frac{7}{8}$ Facit $\frac{32}{7}=4\frac{4}{7}$ (8) $\frac{1}{2}$ of $\frac{2}{6}=\frac{1}{3}$ and $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$ Then $\frac{1}{3}\times\frac{1}{2}$ Facit $\frac{2}{5}$

(7) $\frac{2}{3}$ of $\frac{3}{4}=\frac{1}{2}$ & $\frac{1}{5}$ of $\frac{19}{1}=\frac{19}{5}$, Then $\frac{19}{5}\div\frac{1}{2}=\frac{38}{5}=7\frac{3}{5}$ Facit.

(9) $\frac{2}{3}$ of $\frac{3}{4}=\frac{7}{12}$ or, $\frac{1}{2}$ & $\frac{1}{2}$ of $\frac{2}{3}=\frac{1}{3}$ Then, $\frac{1}{2}\div\frac{1}{3}=\frac{3}{2}=1\frac{1}{2}$ Facit.

(10) $4\frac{5}{9}=\frac{41}{9}$ and $\frac{5}{9}$ of $\frac{4}{1}=\frac{20}{9}$ Then, $\frac{41}{9}\div\frac{20}{9}=\frac{369}{180}=2\frac{1}{20}$ Facit.

(11) $\frac{5}{9}$ of $\frac{4}{1}=\frac{20}{9}$ & $4\frac{5}{9}=\frac{41}{9}$ Then, $\frac{20}{9}\div\frac{41}{9}=\frac{180}{369}=\frac{20}{41}$ Facit.

(12) $\frac{7}{8}$ of $\frac{6}{1}=\frac{42}{8}$ and $\frac{3}{4}$ of $\frac{6}{7}$ of $\frac{11}{3}=\frac{198}{336}=\frac{33}{56}$ Then, $\frac{42}{8}\div\frac{33}{56}=\frac{2352}{264}=8\frac{16}{11}$ Facit.

(13) $7\frac{1}{3}=\frac{22}{3}$ and $9\frac{5}{9}=\frac{86}{9}$ then, $\frac{22}{3}\div\frac{86}{9}=\frac{198}{258}=\frac{33}{43}$ answer.

(14) $\frac{2}{3}$ of $\frac{1}{3}=\frac{2}{9}$ and $\frac{4}{7}$ of $7\frac{3}{8}=\frac{4}{7}$ of $\frac{38}{8}=\frac{190}{56}=\frac{18}{7}$ Then, $\frac{2}{9}\div\frac{18}{7}=\frac{14}{342}=\frac{7}{171}$ answer.

(15) $5205\frac{1}{2}=\frac{2602}{2}$ and $\frac{4}{5}$ of $\frac{91}{1}=\frac{364}{5}$ Then, $\frac{2602}{2}\div\frac{364}{5}=\frac{13010}{1820}=71\frac{1}{2}$ answer.

THE SINGLE RULE OF THREE DIRECT, IN VULGAR FRACTIONS.

EXAMPLES.

(2) Thus; As $\frac{11}{15}$lb. : $\frac{7}{15}s.$ :: $\frac{32}{45}$lb. : $\frac{2912}{7098}s.$ For $\frac{13}{11}\times\frac{7}{15}\times\frac{32}{43}=\frac{2912}{7098}=4d.\frac{1457}{2365}$ qrs. answer.

(3) Thus; As $\frac{4}{7}$E.E. : $\frac{7}{15}L.$ :: $\frac{5}{4}$E.E. : $\frac{49}{48}L.$ For $\frac{7}{15}\times\frac{7}{15}\times\frac{1}{1}=\frac{49}{225}L.=18s.\ 10\frac{2}{15}d.$ answer.

(4) $16\frac{5}{12}s.=\frac{197}{12}s.$ Then, as $\frac{3}{4}$ oz. : $\frac{197}{12}s.$ :: $\frac{3}{4}$ oz. : $\frac{591}{86}s.$ For $\frac{1}{4}\times\frac{197}{12}\times\frac{3}{1}=\frac{591}{96}s.=6s.\ 1d.\ \frac{1}{2}$qr. $\frac{1}{2}$. answer.

(5) $6\frac{1}{2}=\frac{13}{2}$=the first term; $9\frac{1}{4}=\frac{37}{4}$ the third term, Then as $\frac{13}{2}$yd. : $\frac{18}{1}s.$ :: $\frac{37}{4}$yd. : $\frac{1332}{52}s.$ For $\frac{2}{13}\times\frac{18}{1}\times\frac{37}{4}=\frac{1332}{52}s.$ or $1l\ 5s\ 7\frac{1}{13}d.\ \frac{7}{13}$.

(6) Thus; As $\frac{1}{1}$bu. : $\frac{8\frac{1}{2}3}{1}d.$ :: $\frac{500}{1}$bu. : $\frac{141\frac{1}{2}900}{1}d.$ For $243\times500\div5=28300d.$ which $\div12$ & $20=117l.$ 18 4 ans.

(7) $1\frac{1}{4}=\frac{4}{3}$ & $16\frac{1}{4}=\frac{65}{4}$. Then, as $\frac{4}{3}$yd. : $\frac{9}{1}s.$ :: $\frac{65}{4}$yd. : $\frac{2340}{1}s.$ For $\frac{4}{3}\times\frac{9}{1}\times\frac{65}{4}=\frac{2340}{1}s.=5l.$ 17$s.$ answer.

(8) $17\frac{1}{3}s.=\frac{656}{3}s.$ Then, as 1yd. : $\frac{56}{3}s.$ :: 100yd. : $\frac{5600}{3}s.$ For $56\times100\div5=1720s$ which $\div20=86l.$ answer.

(9) $5\frac{1}{2}s.=\frac{11}{2}$ & $16\frac{1}{11}$oz. $=\frac{2761}{165}$. Then, as $\frac{1}{1}$oz. : $\frac{11}{2}s.$ :: $\frac{2761}{165}$ oz. : $\frac{27611}{330}s.$ For $\frac{11}{2}\times\frac{2761}{165}=\frac{27611}{330}s.$ And $2761\div30=92\frac{1}{30}s.$ or $4l$ 12s 0$d.$ 1qr.$\frac{3}{4}$ answer.

(10) $14\frac{4}{20}=\frac{284}{20}$ & $7\frac{1}{2}$C.$=\frac{15}{2}$. Then, as $\frac{20}{1}$C. : $\frac{284}{20}l.$ :: $\frac{15}{2}$C. : $\frac{4260}{360}l.$ For $\frac{1}{20}\times\frac{284}{20}\times\frac{15}{2}=\frac{4260}{360}l.=118l$ 6s 8$d.$ answer.

(11) $\frac{2}{3}$ of $\frac{1}{1}^{9}=\frac{38}{3}s.$ Then, as $\frac{3}{2}$E.E. : $\frac{38}{3}s.$ :: $\frac{7}{1}$E.E. : $\frac{1330}{9}s.$ For $\frac{2}{3}\times\frac{38}{3}\times\frac{7}{1}=\frac{1330}{9}=147\frac{7}{9}s.$ or 7$L.$ 7s 9$d.$ 1 qr. $\frac{1}{3}$. answer.

(12) 4s 9$\frac{3}{8}d.=57\frac{3}{8}d.$ which $\div8$lb.$=7\frac{1}{8}d.$ per. lb. answer.

(13) $15\frac{5}{8}s=\frac{125}{8}s.$ and $27\frac{1}{16}$yds.$\times4=109\frac{1}{4}=\frac{219}{2}$yds. Then, as $\frac{1}{1}$yd. : $\frac{125}{8}s.$ :: $\frac{219}{2}$yd. : $\frac{27375}{16}s.$ & $27375\div16=1710\frac{15}{16}s.$ or $85l$ 10s 11$\frac{1}{4}d.$ answer.

(14) 6s 0$\frac{1}{2}d.=72\frac{1}{2}d.=\frac{145}{2}d.$ and $24\frac{1}{3}\times3\frac{1}{4}=85\frac{1}{6}$ yds. the quantity. $85\frac{1}{6}$yds$=\frac{511}{6}$yd. Then, as $\frac{1}{1}$yd. : $\frac{145}{2}d.$ :: $\frac{511}{6}$yd : $\frac{74095}{12}d.$ For $\frac{145}{2}\times\frac{511}{6}=\frac{74095}{12}d.$ and $74095\div12=6174\frac{7}{12}d.$ or $25l$ 14s 6$\frac{1}{2}d.$ $\frac{1}{2}$. answer.

(15) $\frac{1}{3}\times\frac{1}{6}$ $\frac{2}{5}$ of $\frac{2}{1}=\frac{2}{5}$lb. & 14lb.$-\frac{2}{5}=13\frac{3}{5}$ lb. $=\frac{68}{5}$lb. $\frac{6}{18}-\frac{3}{18}=\frac{3}{18}=\frac{1}{6}$lb. 1st, term; also $13\frac{1}{2}s.=\frac{66}{5}s.$ 2d. term. Then, as $\frac{1}{6}$lb. : $\frac{66}{5}s.$ :: $\frac{68}{5}$lb. : $\frac{2692}{25}s.$ For $\frac{6}{1}\times\frac{66}{5}\times\frac{68}{5}$ $=\frac{2692}{25}s.=4l$ 9s 9$\frac{3}{25}d.$ answer.

(16)

		120 at 8$\frac{5}{8}s.$		
$\frac{4}{8}$	$\frac{1}{4}$	12	0 at 2$s.$	
			4	
		48	0	
$\frac{1}{8}$	$\frac{1}{2}$	3	0	
		0	15	

L. 51 15 Prime cost.

	L.	*s.*
From	70	0 sold for
Take	51	15 bought for
L.	18	5 whole gain.

Then, as 51l 15$s.$: 18l 5$s.$ :: 100$l.$: 35l 5s 3$\frac{1}{2}d.$ $\frac{53}{69}$ answer.

(17) $17\frac{1}{2}l. = \frac{35}{2}l.$ & $13\frac{2}{3}$lb. $= \frac{41}{3}$ lb. Then, as $\frac{1}{2}^2$ lb. : $\frac{35}{2}l.$ :: $\frac{41}{3}$lb. : $\frac{1435}{2}l.$ For $\frac{1}{115} \times \frac{35}{2} \times \frac{41}{3} = \frac{1435}{690} = 2\frac{406}{690}l.$ or $2l\ 3s.\ \frac{3}{114}$ answer.

(18) $1s. \times 12 + 3 = 15 = \frac{2}{16}L.$ and $73\frac{1}{16}l. = \frac{1169}{16}l.$
$1l. \times 20 \times 12 = 240 = \frac{15}{16}L.$ and $250l\ 10s = 250\frac{1}{2}l. = \frac{501}{2}L.$
Then, as $\frac{1169}{16}l. : \frac{1}{2}$pt. :: $\frac{501}{2}l. : \frac{8016}{18704}$pt. For $\frac{16}{1169} \times \frac{1}{2} \times \frac{501}{2} = \frac{8016}{18704} = \frac{3}{7}$ answer.

(19) mul. $3\frac{1}{2}$ and $1\frac{1}{2}$ by $3\frac{1}{2}$ by $1\frac{1}{2}$

$10\frac{1}{2}$ $\frac{3}{2})1\frac{1}{2}$ $3\frac{1}{2} \div \frac{1}{2} = 1\frac{3}{4}$ $0\frac{3}{4}$

$12\frac{1}{4}$lb. $= \frac{49}{4}$lb. and $2\frac{1}{4}l. = \frac{9}{4}l.$

$\frac{1}{2}$ of $\frac{1}{2}$ of $\frac{49}{4} = \frac{49}{16}$lb.

$12\frac{1}{4}$lb. $2\frac{1}{4}$lb. Then, as $\frac{49}{4}$lb. : $\frac{9}{4}$lb. : $\frac{49}{16}$lb. :: $\frac{1764}{4}l.$
For $\frac{4}{49} \times \frac{9}{4} \times \frac{49}{16} = \frac{1764}{4704}L.$ and $1764 \times 20s \div 4704 = 7\frac{1}{2}s.$ or $7s\ 6d.$ answer.

(20) $22\frac{3}{8} \times 4\frac{1}{4}$ $8\frac{1}{4}s. = \frac{33}{4}s.$ second term.

$\frac{179}{8} \times \frac{17}{4} = \frac{3461}{32}$yds. Then, as $\frac{1}{4}$yd. : $\frac{33}{4}s.$ :: $\frac{3461}{32}$ yd. :: $\frac{114903}{128}s.$ For $\frac{33}{4} \times \frac{3461}{32} = \frac{114903}{128} = 929\frac{123}{128}s. = 46L.$ $9s\ 11d.$ 2qrs. $\frac{1}{2}$. answer.

(21) $\frac{3}{5}$ of $\frac{4}{7} = \frac{8}{15}$ Then, as 8 parts : $319L.$ :: 15 parts : $598l\ 2s\ 6d.$ answer.

THE SINGLE RULE OF THREE INVERSE, IN VULGAR FRACTIONS.

EXAMPLES.

(2) $1\frac{1}{5}$yd. $= \frac{6}{5}$ & $3\frac{1}{4}$yd. $= \frac{13}{4}$ Then, as $\frac{6}{5}$ yd. : $\frac{13}{4}$yd. : : inverted.
$\frac{4}{7}$yd. : $4\frac{7}{8}$yds. For $\frac{6}{5} \times \frac{13}{4} \times \frac{5}{4} = \frac{390}{80} = 4\frac{7}{8}$yds. $= 4$yds. 3 qrs. 2na. answer.

(3) $28\frac{1}{3}$ da. $= \frac{85}{3}$ days. Then, as $\frac{16}{1}$ m. : $\frac{85}{3}$ :: $\frac{12}{1}$ m. : inverted.
$\frac{1360}{36}$ days. For $\frac{16}{1} \times \frac{85}{3} \times \frac{1}{12} = \frac{1360}{36}$ days. (i.e.) $1360 \div 36 = 37\frac{7}{9}$ days. answer.

(4) $20\frac{1}{2}$yds. $=\frac{41}{2}$ & $1\frac{1}{2}$yd. $=\frac{4}{3}$. Then, as $\frac{4}{3}$yd. : $\frac{41}{2}$yd. : : inverted.

$\frac{3}{4}$yd. : $\frac{820}{24}$yds. For $\frac{4}{3}\times\frac{41}{2}\times\frac{4}{3}=\frac{820}{24}$yds. $820\div24=34\frac{1}{6}$yds. answer.

(5) As $3 : 4\frac{1}{2}$: : $10 : 1\frac{7}{10}$hr. For $4\frac{1}{2}\times3\div10=1\frac{7}{10}$hr. or 1hr. 21 min. answer.

(6) $5\frac{1}{2}s.=\frac{11}{2}$ & $2\frac{1}{2}$oz. $=\frac{5}{2}$oz. Then, as $\frac{7}{1}$oz. : $\frac{11}{2}s.$: : $\frac{5}{2}$oz. : $15\frac{4}{10}s.$ inverted.

For $\frac{7}{1}\times\frac{11}{2}\times\frac{2}{5}=\frac{154}{10}=15\frac{4}{10}s.=15s$ 4*d.* 3qrs. $\frac{1}{5}$ answer.

(7) $6\frac{1}{4}s.=\frac{25}{4}s.$ $4\frac{1}{2}s.=\frac{9}{2}s.$ Then, as $\frac{25}{4}s.$: $\frac{9}{1}$oz. : : $\frac{9}{2}s.$: inverted.

$\frac{450}{36}$oz. $=12\frac{1}{2}$oz. For $\frac{25}{4}\times\frac{9}{1}\times\frac{2}{9}=\frac{450}{36}$oz. and $450\div36=12\frac{1}{2}$oz. $=12$ oz. 8dr. answer.

(8) $3\times4=12$. Then as 3qr. : 12yd. : : 4qr. : 9yds. ans.

(9) $1\frac{1}{4}$yd. $=\frac{5}{4}$yd. Thus, as $\frac{5}{4}$yd. : $\frac{275}{1}$yd. : : $\frac{3}{4}$yd. : $\frac{5500}{12}$ inverted.

yds. For $\frac{5}{4}\times\frac{275}{1}\times\frac{4}{3}=\frac{5500}{12}$yds. and $5500\div12=458\frac{1}{3}$ yds. answer.

(10) An Ell Eng. $=\frac{5}{4}$yd. Then, as $\frac{3}{4}$yd. : $\frac{240}{1}$yd. : : $\frac{5}{4}$yd. inverted.

: $\frac{240}{20}=12$ yds. For $\frac{3}{4}\times\frac{240}{1}\times\frac{4}{5}=\frac{2880}{20}=12$ yds. answer.

(11) $5\frac{8}{9}$C. $=\frac{53}{9}$ of $\frac{4}{7}$ of $\frac{21}{8}=\frac{5936}{9}$lb. $6\frac{3}{4}d.=\frac{27}{4}d.$ and $8\frac{5}{8}s.=\frac{69}{8}$ of $\frac{12}{1}=\frac{828}{8}d.$ Then, as $\frac{27}{4}$: $\frac{5936}{9}$: : $\frac{828}{8}$: $43\frac{1}{69}$ inverted.

lb. For $\frac{27}{4}\times\frac{5936}{9}\times\frac{8}{828}=\frac{1282176}{29808}=43\frac{1}{69}$lb. answer.

(12) $12\frac{1}{2}s.=\frac{25}{2}s.$ $240\frac{1}{7}$ pieces $=\frac{1681}{7}$, and $20\frac{1}{8}s.=\frac{161}{8}s.$ Then, as $\frac{25}{2}s.$: $\frac{1681}{7}$ pes. : : $\frac{161}{8}s.$: $\frac{336200}{2254}$ pieces. inverted.

For $\frac{25}{2}\times\frac{1681}{7}\times\frac{8}{161}=\frac{336200}{2254}=149\frac{177}{1127}$ pieces answer.

(13) $100\frac{3}{4}l.=\frac{403}{3}l.$; $6\frac{2}{3}$mo. $=\frac{20}{3}$ mo. and $3\frac{5}{6}=\frac{23}{6}$ of $\frac{12}{1}=\frac{276}{6}=\frac{46}{1}$mo. Then, as $\frac{20}{3}$mo. : $\frac{403}{3}L.$: : $\frac{46}{1}$mo. : $\frac{60460}{414}$ inverted.

$=14\frac{244}{414}L.$ For $\frac{20}{3}\times\frac{403}{3}\times\frac{1}{46}=\frac{60460}{414}L.=14l$ 11*s* 9*d.* 1qr. $\frac{55}{69}$ answer.

(14) $5\frac{7}{12}=\frac{67}{12}s.$ $26\frac{5}{8}=\frac{213}{8}$yds. and $8\frac{1}{2}=\frac{17}{2}s.$ Then, as $\frac{67}{12}s.$: $\frac{213}{8}$yds. : : $\frac{17}{2}s.=\frac{28542}{1632}$yds. For $\frac{67}{12}\times\frac{213}{8}\times$ inverted.

$\frac{2}{17}=\frac{28542}{1632}=17$yds. 2qrs. 3na. $\frac{14}{17}$ answer.

THE DOUBLE RULE OF THREE IN VULGAR FRACTIONS.

EXAMPLES.

(2) Stated stud. 9 thus; days 18 $\rightarrow$ 10$\frac{7}{9}$*l.* 9 $\leftarrow$ 20 students 30 days $\rightarrow$ 39$\frac{1338}{1458}$*L.*

162 97/9 600

For $600\times97\div162\times9=39\frac{13}{14}\frac{38}{56}L.=39l\ 18s\ 4\frac{80}{81}d.$ answer.

(3) Thus; m 3 d. 19$\frac{1}{2}$ $\rightarrow$ 8$\frac{9}{10}$*l.* $\leftarrow$ 20 mon. 100$\frac{1}{4}$ days $\rightarrow$ $305\frac{14}{468}L.$

$19\frac{1}{2}\text{days}\times3\text{m.}=\frac{117}{2}$; $8\frac{8}{10}l.=\frac{89}{10}l.$ and $100\frac{1}{4}\text{days}\times20\text{m.}=\frac{8020}{4}$. Then, inverted, $\frac{2}{117}\times\frac{89}{10}\times\frac{8020}{4}=1\frac{42756}{4680}L.=305l\ 0s\ 8\frac{8}{39}d.$ answer.

(4) Thus; P. 5 w. 1 $\rightarrow$ 7$\frac{4}{5}$ G. $\leftarrow$ 8 Pers. 22$\frac{1}{2}$ w. $\rightarrow$ $280\frac{20}{81}$ gal.

$7\frac{4}{5}\text{gal.}=\frac{39}{5}\text{gal.}$ and $22\frac{1}{2}\text{w.}\times8\text{per.}=180$ third term.

1st. term inver.

Then, $\frac{180}{1}\times\frac{39}{5}\times\frac{1}{5}=\frac{7020}{25}=280\frac{4}{5}$ 3gal. answer.

(5) Thus, 14 pers. weeks $\rightarrow$ 40$\frac{1}{3}L.$ Inversely; 46pers. $\leftarrow$ 20$\frac{3}{4}L.$ $\rightarrow$ $3\frac{46}{173}$ weeks.

$40\frac{1}{3}=\frac{304}{3}\times46=\frac{9384}{3}$ and $20\frac{3}{4}=\frac{143}{7}\times14=\frac{2002}{7}$. Then $\frac{6}{9384}\times\frac{30}{1}\times\frac{2002}{7}=\frac{200200}{65688}=3\frac{56}{1173}$ weeks answer.

(6) First, $13\frac{1}{3}=\frac{40}{3}L.$ and $1\frac{1}{12}=\frac{13}{12}L.$ interest.

Thus; as $\begin{cases}\frac{40}{3}L.\\ 1\text{yr.}\end{cases}\rightarrow\frac{13}{12}L.\leftarrow\begin{cases}\frac{50}{1}L.\\ \frac{5}{12}\text{yr.}\end{cases}\rightarrow2\frac{37}{144}L.$

Secondly, $\frac{40}{3}\times\frac{3}{4}=\frac{120}{12}=\frac{10}{1}$ and $\frac{50}{1}\times\frac{5}{12}=\frac{250}{12}$. Then, as inverted $\frac{10}{1}:\frac{13}{12}::\frac{250}{12}:\frac{3250}{1440}L.$ For $\frac{1}{10}\times\frac{13}{12}=\frac{250}{12}\times\frac{3250}{1440}=2\frac{37}{144}L.$ or $2l\ 5s\ 1d.$ 2qr.$\frac{2}{3}$ the Interest.

To find the rate per cent. $\frac{50}{1}\times\frac{5}{12}=\frac{250}{12}$ and $\frac{100}{1}\times\frac{13}{12}=\frac{1300}{12}$. Then, as $\frac{250}{12}:\frac{3250}{1440}L.::\frac{1200}{12}:10\frac{5}{6}L.$ For $\frac{12}{3250}\times\frac{3250}{1440}\times\frac{1200}{12}=10\frac{5}{6}L.$ answer.

(7) $2l\ 5s\ 1d.$ 2qr.$\frac{2}{3}=\frac{3250}{1440}L.$ $13\frac{1}{3}=\frac{40}{3}L.$ and $1\frac{1}{12}=\frac{13}{12}L.$

Thus by 2 statings.

1st. inversely, as $\frac{50}{1}:\frac{5}{12}::\frac{40}{3}:\frac{750}{480}$ year. For $\frac{50}{1}\times\frac{5}{12}\times\frac{3}{40}=\frac{750}{480}$; 2nd. as $\frac{3250}{1440}:\frac{750}{480}::\frac{13}{12}:\frac{1404000}{1872000}$ year. For $\frac{1440}{3250}\times\frac{750}{480}\times\frac{13}{12}=\frac{1404000}{1872000}=\frac{3}{4}$ year the time.

Now to find the Rate. $\frac{40}{3}\times\frac{3}{4}=\frac{120}{12}=\frac{10}{1}$ and $\frac{100}{1}\times\frac{12}{12}=\frac{1200}{12}$ $=\frac{100}{1}$ Then, as $\frac{10}{1}:\frac{10}{12}::\frac{100}{1}:\frac{1300}{120}L.$ For $\frac{1}{10}\times\frac{13}{12}\times\frac{100}{1}=\frac{1300}{120}=10\frac{8}{8}L.$ answer.

4)m. lb. 4 m. lb.

(8) Thus; as 12 : $1\frac{1}{8}$ :: 8 : $\frac{3}{4}$

3 2 2

3)$2\frac{2}{3}$

$0\frac{8}{24}=\frac{3}{4}$lb.

mo. lb. mo.

Then, as 1 : $\frac{3}{4}$: : 6 : $4\frac{1}{2}$lb.

6

$18\div4=4\frac{1}{2}$lb. answer.

(9) $56\frac{1}{4}=\frac{225}{4}L.$ and $5\frac{1}{3}=\frac{16}{3}$ year.

Then, as $\frac{1}{3}$yr. : $\frac{225}{4}L.$: : $\frac{16}{3}$yr. $\frac{11400}{36}L.=400L.$ for 2 Sons. For $\frac{4}{3}\times\frac{225}{4}\times\frac{16}{3}=\frac{11400}{36}=400L.$ and $400\times3\div2=600L.$ answer.

DECIMAL FRACTIONS.

ADDITION.

EXAMPLES.

(2) *L.* 857,7383

(3) 450,
31,47
376,004
1,08
456,
,76
,05

answer 1315,364

(4) 2476,8471
94,9
9,8941
867,05
84,9
271,007
5,1008
1,6789

answer 3811,3779

SUBTRACTION OF DECIMALS.

EXAMPLES.

1636,368 Gallons.	14894,399 Miles.	808,5581 Acres.
		841,46 109,62 34,691
(1) From 100,17	From 985,771	
Take 84,476		478,462
answer 15,694		37,66
		378,8
		Take 894,922
		answer 90,849

MULTIPLICATION OF DECIMALS.

EXAMPLES.

(2) mul. 79,347	(3) mul. ,63478
by 23,15	by ,8264
396735	253912
79347	380868
238041	126956
158694	507824
Facit 1836,88305	Facit ,524582192
(4) mul. 3,141592	(5) mul. ,385746
by 52,7438	by ,00463
25132736	1157238
9424776	2314476
12566368	1542984
21991144	
6283184	Facit ,00178600398
15707960	
Facit 165,6995001296	

(6) Mul. .002534
.03256

15204
12670
5068
7602

Facit 00008250704

(7) Thus; 245.378 263
5834.27

171764784
4907565
981513
73614
19630
122

Facit 17774.6333

(8) Thus; 674.4378
863.72

134888
47210
2023
405
54

Facit 18458,0

(9) Thus; 27.1498600
53014.29

2443487400
54299720
10859944
271499
8145
1357

Facit 2508,928065

(10) Thus; 184.82 07
394 75.31

184 82 07
55 44 62
9 24 10
1 29 38
7 39
1 66
6

Facit 2508.928

DIVISION OF DECIMALS.

EXAMPLES.

(2) 23,15)1836,88305(79,347 Facit.

1620 5
216 38
208 35
8 033
6 945
1 0880
9260
16205
16205

(3) 158,694)3673,7661(23,15 fac.

3173 88
499 886
476 082
23 8041
15 8694
793470
793470

(4) 64,25)234,70525(3,653 Facit.

192 75
41955
38550
34052
32125
19275
19275

(5) ,9)9,0

Facit 10

(6) 9),9

Facit ,1

(7) 3),3

Facit ,1

(8) ,00463),00178600398(,385746 Facit.

1389
3970
3704
2660
2315
3453
3241
2129
1852
2778
2778

(9) 92,41035)2508,928065051(27,1498 Facit
18482070
6607210
6468725
138485
92410
46075
36964
9111
8317
794
739
55

(10) 771492),00357200796(,00463 Facit.
3085968
4860399
4628952
2314476
2314476

(11) 9,3654070)87,0763260(9,2976552
842886630
27876630
18730814
9145816
8428866
716950
655578
61372
56192
5180
4683
497
468
29
19
10

(12) 18,730814)174,152652(9,297 Facit.
16 8577
5575
3746
1829
1686
143
131
12

REDUCTION OF DECIMALS.

CASE 1.

EXAMPLES.

(2) $\frac{1}{2}$)1,0 Facit ,5

(3) $\frac{3}{4}$)3,00 Facit ,75

(4) $\frac{5}{26}$)5,0000(,1923+facit.
26
240
234
60
52
80
78
2

(5) $\frac{26}{57}$)26,00000(,45614+Facit.
228
320
285
350
342
80 &c.

(6) $\frac{11}{14}$ of $\frac{10}{13}$ = $\frac{110}{182}$
Then, 182)110,0000000(,6043956+Facit.
109 2
0 800
728
720
546
1740 &c.

(7) $4)\frac{12}{16}=\frac{3}{4}$ of $\frac{5}{13}$ of $\frac{7}{26}=\frac{105}{1352}$

Then, 1352)105,00000(,07766+Facit.

9464

10360

9464

8960

8112

8480

8112

368

(8) $\frac{3}{8}$)3,000

Facit ,375

(9) $\frac{1}{25}$)1,00

Facit ,04

(10) $\frac{11}{20}$)11,00 Facit ,55 — $\frac{57}{60}$)57,00 Fac. ,95 — $\frac{16}{50}=\frac{8}{25}$)3,000 Facit ,375 — $\frac{7}{8}$)7,000 Fac. 875

$\frac{14}{2356}=14,0000000\div 256=,0546875$. Facit.

CASE 2.

(2) 12|6,0 *d.*

20|7,500*s.*

Facit ,375*L.*

(3) 12|9,00*d.*

20| ,7500*s.*

Facit ,0375*L.*

(4) 4| 1,00 qrs.

12| 9,2500000*d.*

20|10,7708333*s.*

Facit ,5385416*L.*

(5) 1lb.×12×20×24=5760 grains in 1lb.

Then 24,00000000÷5760=,0041666+ Facit.

(6) 16oz.×16dr.=256dr.=1lb.

dr.

Then, 256)14,00000(,0546875 Fac.

1280

1200

1024

1760 &c.

(7) a Ton=20 C. 4 C. qr. 2 / 4 4 — qrs. 80)18,000

Facit ,225 T.

(8) Fur. P. yds.

A mile=8×40×5½yds=1760yds.

Then, 76,000000yds.÷1760=

,04318+Facit.

(9) A yard = 4 qrs. 3 nails. 2

4 | 4

na. 16 | 14,000 (,875 yd.
128

12 &c.

(10) An acre = 160 perches.

4,0000 (,025 acre.
3 20

800
800

(11) 1 gal. = 8pts.) 1,000

Facit ,125 gal.

(12) 1day = 24hr. × 60min. = 1440min.

Then, 7,00000min. ÷ 1440 = ,00480 + day. Facit.

(13) 28 | 14,0lbs.

4 | 2,500qrs.

Facit 3,625C.wt.

(14) 4 | 3,00na.

4 | 2,7500qrs.

Facit 7,6875yds.

(15) 40 | 14,00 poles.

4 | 1,3500 R.

Facit 13,3375 acres.

(16) 7 | 5,000000 days.

4 | 1,714285 + weeks.

Facit 3,428571 + months.

CASE 3.

(2) ,76*L*.
20
s. 15,20
12
d. 2,40
4
qr. 1,60

(3) ,625*s*.
12
d. 7,500
4
qrs, 2,000

(4) ,8322916*L*.
20
s. 16,6458320
12
d. 7,7499840
4
qrs. 2,9999360

(5) ,861 Cwt.
4
qrs. 3,444
28
lbs. 12,432
16
oz. 6,912
16
dr. 14,592

(6) ,7 lb. Troy
12
oz. 8,4
20
dwt. 8,0

(7) ,761 day.
24
hrs. 18,264
60
min. 15,840
60
sec. 50,400

(8) 4oz.=$\frac{1}{3}$),71 of 4oz Troy.

,236666+lb.
12+7

oz. 2,839999
20

dwt. 16,799980
24

grs. 19,1999520

(9) ,67 of a League.

3
m. 2,01
8
fur. 08
40
P. 3,20
5½
100
+10
qr. 1,10
3
ft. ,30
12
in. 3,60
3
b.c. 1,80

(10) ,4712 of an E. Eng.

5
qrs. 2,3560
4
na. 1,4240

(11) 3A. 2R. 4|2,0R.

3,5 acre.
×,092
70
315
,3220 acre.
4
R. 1,2880×40
P. 11,5200

(12) A year=365,25 days.

,3
days 109,575
24
2300
1150
hr. 13,800
60
min. 48,000

(13) ,6875 yds.×4=2,7500qrs.×4=3,00 na. answer.

(14) ,3375 Acre.

4
R. 1,3500
40
P. 14,0000

(15) Thus; ,785*L.*

s. 15 8½

For 7+7+1=15*s.* 0*d.*
and 35—1=34qrs.= 8½

answer *s.* 15 8½

(16) Thus; ,875 of a *L.*

17 6

For 8+8+1=17*s.*
and 25—1=24qr.=6*d.*
answer *s.* 17 6

(17) mul. 12,4
by 9

answer *L.* 111,6=111*l* 12

(18) 25yds. at 2,75

25

1375
550

L. 68,75
20

s. 15,00

(19) ,48 of a lb.

20

9,60
+,16 of a *s.*

s. 9,76
12

d. 9,12

(20) ,17 of a lb. troy

12

2,04
+ ,84 of an oz.

oz. 2,88
20

dwt. 17,60
24

gr. 14,40

(21) ,17 of a T.

20

3,40
+,19C.wt.

C.wt. 3,59
4

2,36
+,17 qrs.

qrs. 2,53
28

14,84
+ ,7 of a lb.

lb. 15,54

(22) ,78 Acre.

4

3,12
+,67R.

R. 3,79
40

P. 31,60

(23) ,17 of a *L.*

20

3,40
—,7 of a *s.*

s. 2,70
12

d. 8,40
4

qr. 1,60

(24) ,41 of a day.

24

164
82

9,84
—,16 of an hr.

hr. 9,68

then, hr. 9, 68
60

min. 40,80
60

sec. 48,00

THE SINGLE RULE OF THREE IN DECIMALS. DIRECT PROPORTION.

EXAMPLES.

(2) Thus; as 1,6C. : 3*l* 12,76*s*. : : 11C. 3qr. 10,12lbs.× 3, Or, as 179,2lbs. : 3,638*L*. : : 3978,36lbs. : 80,76 6036*L*. For 3978,36×3,638÷179,2=80*L* 15*s* 3*d*. 3, 36qrs. answer.

(3) Thus; as 1,5oz. : 7,8*s*. :: 9,7lb. Or, as 1,5oz. : 7,8*s*. :: 116,4 oz. : 605,28*s*. For 116,4×7,8=907,92 which ÷1,5=30*l* 5*s* 3*d*. 1,44qr. answer.

(4) Thus; as 1,47C. : 4,5*l*. :: 1,7lb. Or, as 164,64lbs. : 1080*d*. :: 1,7lb. : 11,1+*d*. For 1080×1,7=1836,0 which÷164,64=11,1+*d*. answer.

(5) Thus; as 1pt. : 1,2*s*. :: 12,5hhds. Or, as 1pt. : 1,2*s*. :: 6300pts. : 378*l*. For 6300×1,2=7560*s*. which÷20=378*l*. answer.

(6) Thus; as 1yd. : 12,3*s*. :: 21,5yds.×3 Or, as 1yd. : 12,3 :: 64,5 : 793,35*s*. For 64,5×12,3=793,35*s*. which ÷20=39*l* 13*s* 4,2*d*. answer.

(7) Thus; as 8,4lb. : 16*s* 4,6*d*. :: 4C. 2qr. 7,4lb.×3. Or, as 8,4lb. : 196,6*d*. :: 1534,2lbs. : 35907,466*d*.+For 1534,2×196,6÷8,4=149*l* 12*s* 3½*d*. nearly. answer.

(8) Thus; as 4*s* 2,6*d*. : 1yd. :: 6*l* 13,12*s*. Or, as 50,6*d*. : 1yd. :: 1597,44*d*. : 31,569yds. For 1597,44÷50,6 =31,569+yds. answer.

(9) 5,8T.×4×63=1461,6gal. and 60,4*l*.×20×12=14496*d*. Then, as 1461,6gal.—50,9gal. : 14496 : : 1gal. : 10,27*d*. +For 14496÷1410,7=10,27 pence. answer.

(10) 7,6C.×4qr.×28lb.=851,2lbs Then, as 1lb. : 4,5*d*. : : 851,2lbs. : 3830,4*d*. For 851,2×4,5=3830,4*d*.= 319,2*s*. sold for. And, as 1C. : 40,1*s*. : : 7,6C. : 304,76*s*. bought for. Then, 319,2*s*.—304,76*s*.=14,44*s*.=14*s* 5*d*. 1,12qr. answer.

(11) 3C. 1,5qr.=378lb. Then, as 1lb. : 2,75*s*. : : 378lb. : 51*l* 19*s* 6*d*. And 60*l* 11*s* 6*d*.—51*l* 19*s* 6*d*.=8*l* 12*s*. gain answer.

(12) From 10,75*s*.—8,5*s*.=2,25*s*. Then, as 1yd. : 2,25*s*. : : 436yds : 981*s*. or 49*l* 1*s*. answer.

(13) Thus; as 1*l*. : 7,5*s*. : : 296,85*l*. : 2226,375*s*.=111*l* 6*s* 4*d* ½*d*. answer.

(14) First 7*s* 9½*d*.=93,5*d*. and 25*l* 18*s* 1½*d*.=6217,75*d*. Then, as 93,5*d*. : 4qrs. : 6217,75*d*. : 266qrs. which÷ 5=53E.E. 1qr. answer.

(15) Thus; as 1yd. : 4,5ct. : : 345yds. : 1552,5cents, or 15D. 52ct. 5m. answer.

(16) Thus; as, 12825m : 675yds. : : 38m. : 2yds. ans.

(17) Thus; as, 19yds. : 25,75D. : : 435,5yd. : 590,217D.+ For 435,5×25,75÷19=590D. 2d. 1ct. $7\frac{2}{19}$m. ans.

(18) $7\frac{3}{8}$yds.=7,375yds. and $5\frac{1}{2}$ dol.=5,5dols. Then, as 1yd. : 5,5 dols. :: 7,375 yds. : 40,5625 dols.=40 dols. $56\frac{1}{4}$ct. answer.

(19) Thus; as 7,375yds. : 40,5625dol. :: 1yd. : 5,5dol. For 40,5625÷7,375=5,5dols. answer.

(20) Thus; as 1,068ft. : 1 ft. :: 6ft. : 5,618ft.

$$
\begin{array}{r}
6 \\
\hline
1{,}068\overline{)6{,}0000000}\ (5{,}618\text{ft. nearly. ans.} \\
5340 \\
\hline
6600 \\
6408 \\
\hline
1920 \\
1068 \\
\hline
8520 \\
8544
\end{array}
$$

INVERSE PROPORTION.

EXAMPLES.

(2) Thus; as 6*l*. : 1,1333oz. :: 1,8125 : 3,75 oz. nearly. For 1,1333×6=6,7998 which÷1,8125=3oz. 12dr. ans.

(3) Thus; as 1ft. : 12ft. :: ,75ft. : 16ft. For 12,00÷,75 =16 feet. answer.

(4) Thus; as 1,25 yd. : 25,5 yds. :: ,75 yds. : 42,5 yds. For 25,5×1,25÷,75=42,5yds. answer.

(5) Thus; as 1E. : 4,5*s*. :: 25,6E. : 115,2*s* value of B's Holland. Then 115,2÷40,7=2,8304*s*.=2*s* 9*d*. 3,8qrs. per yd. answer.

(6) 34,5×100=3450*s*. As 7,5*s*. : 1D. :: 3450*s*. : 460D. For 3450÷7,5=460 dollars. answer.

(7) Thus; as 15mo. : 450*l*. :: 7,5mo. : 900*l*. For 450× 15÷7,5=900*l*. answer.

THE DOUBLE RULE OF THREE IN DECIMALS.

EXAMPLES.

(2) Thus; as $\left\{\begin{array}{r}2\text{men} \\ 1\text{day}\end{array}\right\}$: 4,625*s*. :: $\left\{\begin{array}{r}4\text{ men} \\ 10{,}5\text{ days}\end{array}\right\}$: 97,125*s*. For 4,625×4×10,5÷2=4*l* 17*s* $1\frac{1}{2}$*d*. answer.

(3) Thus; as $\left\{\begin{array}{r}5{,}25\text{C.} \\ 20\text{ m.}\end{array}\right\}$: 16,333 :: $\left\{\begin{array}{r}17{,}75\text{C.} \\ 7{,}5\text{ m.}\end{array}\right\}$: 20,7082*s*. For 16,333×17,75×7,5÷5,25×20=1*l* 0*s* $8\frac{1}{2}$*d*. answer.

(4) $\frac{1}{8}$)417,6 men. acres. men.

Thus; as 52,2 : 5 :: 417,6 : 40. Then.

2d. Inversely, as 6days : 40men :: 12days : 20men. ans.

By a Double stating, the months being inverted.

Thus; as $\left\{\begin{matrix}15{,}25L.\\12{,}75\text{mo.}\end{matrix}\right\}$: 76,94 :: $\left\{\begin{matrix}6\ L.\\9{,}5\text{mo.}\end{matrix}\right\}$: 22,55521$L.$

For $76{,}94\times6\times9{,}5\div15{,}25\times12{,}75=22l\ 11s\ 1\frac{1}{4}d.$ answer.

(6) Thus; by contraction,

As $\left\{\begin{matrix}1=12\text{oxen}\\1=20\text{days}\end{matrix}\right\}$: 16,25 acres :: $\left\{\begin{matrix}24\text{oxen}=2\\100\text{days}=5\end{matrix}\right\}$:162,5 ans

10 10

Acres 162,50 answer.

(7) Thus; the time inverted, As $\left\{\begin{matrix}3{,}5\ L.\\1{,}25\text{qr.}\end{matrix}\right\}$ $L.$ 100 :: $\left\{\begin{matrix}38{,}5L.\\\\1.\ \text{yr.}\end{matrix}\right\}$ :: $L.$ 880

For $38{,}5\times100\div1{,}25\times3{,}5=880L.$ answer.

(8). By inverse proportion.

Thus; as $\left\{\begin{matrix}6\ \text{men}\\12{,}3\ \text{hr.}\end{matrix}\right\}$: 2,5da. : : $\left\{\begin{matrix}9\ \text{men}\\8{,}2\ \text{hr.}\end{matrix}\right\}$: 2,5 days.

For $9\times8{,}2\times2{,}5\div6\times12{,}5=2{,}5$ days. Again $22{,}5\times17{,}3\times10{,}25=3989{,}8125$ feet. And $34{,}6\times45{,}\times12{,}3=19151{,}1$ feet. Then, as 3989,8125 ft. : 2,5days :: 19151,1 ft. : 12 days. For $19151{,}1\times2{,}5\div3989{,}8125=12$ days. answer.

THE SQUARE ROOT.

EXAMPLES.

(3) 5499025(2345 root.
4

43)149
129

464)2090
1856

4685) 23425
23425

(4) 74770609(8647 root.
64

166)1077
996

1724) 8106
6896

17287) 121009
121009

(5) 368863,00(607,34092+root.
36

1207) 8863
8449

12143) 41400
by contrac. 36429
division

1214) 4971
4858

113
109

4
2
2

(6) 3271,4007(57,19+root.
25

107) 771
749

1141) 2240
1141

11429)109907
102861

7046

(7) 2,27109570(1,50701+root.
1

25)127
125

3007) 21095
21049

301401) 0467000
301401

165599

(8) 10,000000(3,162277+root.
9

61)100
61

626) 3900
3756

6322) 14400
12644

632,2) 1756
1264

492
442

50
44

6

(9) ,,,,,
0003272481(,01809 root.
1
28)227
224
3609) 32481
32481

(10) 160,000000(12,649+root.
1
22)60
44
246)1600
1476
2524) 12400
10096
25289) 230400
227601
2799

(11) Thus; s. d.
30 1
12
,,
361(19 ans.
1
29)261
261

(12) Thus; 1,5×1,5=2,25
And 3,5×3,5=12,25
Then, inversely, as 2,25in. : 300min. :: 12,25in. : 55min. 6sec.
300
675,00÷12,25=55min. 6sec. ans.

(13) ,,
484=22 root.
4
42) 84
84

(14) 17×17=289
20×20=400 +
,,
689(26,2+
4
46) 289
276
522) 1300
1044
256

(15) 36×36= 1296
24×24= —576
,,
720(26,83+
4
46)320
276
528) 4400
4224
5363) 17600
16089
1511

(16) $60\times60=3600$ft. long. Again 3600ft. long.
$37\times37=1369$ft. high. $23\times23=529$ft high.

2231(47,23+ft.	3071(55,41ft.
16	25
87) 631	105) 571
609	525
942) 2200	1104) 4600
1884	4416
9443) 31600	11081) 18400
28329	11081
3271	7319

Then, 47,23 } +
55,41 }
answer 102,64 ft. broad.

(17) Com. mea. 761)$\frac{3044}{3849}=\frac{4}{5}$ whose root is $\frac{2}{3}$. answer.

(18) Com. mea. 144)$\frac{7986}{9216}=\frac{49}{64}$ whose root is $\frac{7}{8}$. answer.

(19) $\frac{3168}{6192}$)3168,0000000 The right quotient.

30960	5116279069(,71528+Facit.
7200	49
6192	
10080	141) 216
6192	141
38880	1425) 7527
37152	7125
17280	14302) 40290
12384	28604
48960	143048) 1168669
43344	1144384
56160	24285
55728	
43200	
37152	
6048	

(20) $37\frac{24}{125} = 1\frac{249}{125}$ whose root is $4\frac{1}{5} = 64$ Facit.
(21) $17\frac{16}{125} = 4\frac{241}{125}$ whose root is $2\frac{1}{5} = 41$ Facit.
(22) $76\frac{14}{17}$ Thus; 17)14,00000000

76,82352941+(8,7649+answer.

64
167)1282
1169
1746)11335
10476
17524)85929
70096
175289)1583341
1577601
5740

THE CUBE ROOT.

EXAMPLES.

(2) 34328125(325 root.

27

Defect. div. & square of 2 = 2704) 7328
+180 = comp. divisor 2884) 5768

Defect. div. & squ. of 5 = 307225) 1560125
+4800 = com. divisor 312025) 1560125

Or thus; 34328125(325 Cube root.

27

First divisor = 2790) 7328

2700×2	=	5400
90×2×2	=	360
2×2×2	=	8
		5768

3×3×300	= 2700
3×30	= 90
1st. divisor	= 2790

2d. Divisor = 308160) 1560125

307200 × 5 = 1536000
960 × 5 × 5 = 24000
5 × 5 × 5 = 125
1560125

32 × 32 × 300 = 307200
32 × 30 = 960
2nd. Divisor = 308160

(3)

8460519(439
64
Defect divisor & squar of 3 = 4809) 20604
+360 = complete divisor 5169) 15507

Defect. divisor & squa. of 9 = 554781) 5097519
+11610 = complete divisor 566391) 5097519

(4)

25969407 2(638
216
Defect. divisor & square of 3 = 10809) 43694
+540 = complete divisor 11349) 34047

Defect. divisor & square of 8 = 1190764) 9647072
+15120 = complete divisor 1205884) 9647072

(5)

28069810125(2805
8
Defect. divisor & squ. of 8 = 1264) 14069
+480 = complete divisor 1744) 13952
Defective divisor = 2352 117810
Defect. divis. & squa. of 5 = 23520025) 117810125
+42000 = complete divisor 23562025) 117810125

(6)

673373097125(8765
512
Defect. divisor & squ. of 7 = 19249) 161373
+1680 = complete divisor 20929) 146503
Defect. divi. & squ. of 6 = 2270736) 14870097
+15660 = comp. divisor 2286396) 13718376
Defec. div. & squ. of 5 = 230212825) 1151721125
+131400 = com. divisor 230344225) 1151721125

(7) 12,977875(2,35
8

Defect. divisor & square of 3=1209)4977
+180=complete divisor 1389)4167

Defect. divisor & sqr. of 5=158725)810875
+345=complete divisor 162175)810875

(8) ,001906624(124
1

Defect. divisor & squ. of 2 = 304) 906
+60=complete divisor 364) 728

Defect. divis. & squ. of 4=43216) 178624
+1440=complete divisor 44656) 178624

(9) 15926,972504(25,16+
8

Defect. divisor & squ. of 5=1225)7926
+300=complete divisor 1525)7625

Defec. divi. & squ. of 1=187501) 301972
+750=complete divisor 188251) 188251

Defec. divi. & squ. of 6=18900336)113721504
+45180=complete divi. 18945516)113673096
,48408

(10) 171,467764060(5,555+
125

Defect divi. & squ. of 5=7525)46467
+750=complete divisor 8275)41375

Defec. divi. & squ. of 5=907525)5092764
+8250=comp. divisor 915775)4578875

Defec. divi. & sq. of 5=92417525)513889060
+83250=com. divisor 92500775)462503875
51385186

(11) 12×12×12÷2=864 inches in half a solid foot.
6×6×6= 216—do. in half a foot solid.
Then 648÷216=3 half feet answer.

(12) $12\times12\times12=1728\div216=8$ cubes of 6 inches.
$6\times6\times6=216$

Cube inches in 1 foot $=\frac{1728}{3\times3\times3}=\frac{1728}{27}=64$ cubes of 3 inches. answ.

(13)

1953,125(12,5
1
304) 953
+60 364) 728
43225) 225125
+1800 45025) 225125

(14)

47,45,52(78 root.
343
Defect. divi. & squ. of 8 = 14764) 131552
+1680 = complete divi. 16444) 131552

Then $78\times78=6084$ answer.

(15)

L. *s.*
691 4
20
13,82,4(24 pieces. answer.
8
Defec. divi. & squ. of 4 = 1216) 5824
+240 = comp. divisor 1456) 5824

(16) Common measure $=44(\frac{343}{1188}=\frac{8}{27}$ whose root is $\frac{2}{3}$ ans.
(17) Com. measure $=24)\frac{648}{3008}=\frac{27}{125}$ whose root is $\frac{3}{5}$ answer.

(18) Thus; $\frac{4}{9})4,00000000$

,44,44,44,44+(,763+Fac.
343
Defec. div. & squ. of 6 = 14736) 101444
+1260 = comp. divisor 15996) 95976

Defec. div. & squ. of 3 = 1732809) 5468444
+6840 = comp. divisor 1739649) 5218947
249497

(19) 7)6,000000000
,857142857(,949+
729

{Defec. divisor & square of 4=24316)128142
{+1080=complete divisor 25396)104584
{Defec. divisor & squ. of 9=2650361)26558857
{+25380=comp. divisor 2676261)24086349

2472508

(20) $13\frac{2}{3}$. Thus; 3)2,000000000000

, , , , ,
13,666666666666(2,3908+
8

{Defec. divi. & squ. of 3=1209)5666
{+180=comp. divisor 1389)4167
{Def. div. & sq. of 9=158781)1499666
{+6210=comp. divi. 164991)1484919

Defec. divisor = 171363) 14747666

Def. div. & sq. of 8=1713630064)14747666666
+575100=co. div. 1714205164)13713641312

1034025354

(21) $42\frac{21}{24}=\frac{427}{8}=\frac{343}{8}$ whose root is $\frac{7}{2}=3\frac{1}{2}$ answer.
(22) $5\frac{104}{125}=\frac{729}{125}$ whose root is $\frac{9}{5}=1\frac{4}{5}$ answer.
(23) $405\frac{98}{125}=\frac{50653}{125}$ whose root is $\frac{37}{5}=7\frac{2}{5}$ answer.
(24) $7\frac{3}{5}$)3,0

, , , ,
7,600000000(1,996+ans.
1

{Defec. divisor & squ. of 9=381)6600
{+270=complete divisor 651)5859
{Defec. divi. & sq. of 6=108336)741000
{+3420=com. divisor 111756)670536
{Defec. div. & sq. of 6=11524836)70464000
{+35280=com. divi. 11560116)69360696

1103304

(25) $9\frac{1}{9})1,000000000$

$9,166666666(2,092+$ ans.

8

Defec. divisor 12)1166

Defec. divi. & sq. of 9 = 120081)1166666

+5400 = comp. divi. 12548$\frac{1}{2}$)1129329

Defec. divi. & sq. of 2 = 13104304)37337666

+12540 = comp. divi. 13116844)26233688

11093978

ARITHMETICAL PROGRESSION.

CASE 1.

EXAMPLES.

(2) 16 − 1 = 15

4

60

+ 5

5 + 65 = 70

16 = num. of terms.

2)1120

12) 560 *d.*

2,0) 4,6 8

The last term *d.* 65 = 5*s.* 5*d.* answer *L.* 2 6 8 = sum rec'd

(3) 1 + 100 = 101 sum of extremes.

50 = ½ number of terms.

2,0)505,0*s.*

answer *L.* 252 10

(4) 2 + 2 = 4 the first term,

and 100 × 4 = 400 the last term,

4 + 400 = 404 sum of the extremes.

× 50 = ½ num. of terms.

yds. in a mile = 176,0)2020,0(11 miles.

176

260

176

yds. in a furl. = 22,0) 84,0 yds.

answer 11m. 3fur. 180yds.

(5) 54—1=53 then, 163 sum of extremes.
× 3 com. dif. 54÷2= 27=½no. of terms.

159 1141
+ 2=1st term. 326

last term 161*s.*=8*l.* 1*s.* 2,0)440,1
+ 2

answer *L.* 220 1 whole sum.

163 sum of extre.

(6) 14—1=13 then, *L.* 31 for the last year.
×2 +5
26 36
+6 14÷2= 7
L. 31 for the last yr. *L.* 252 for 14 years.

Then 252÷14=18*l.* annually. ans.

CASE 2.

EXAMPLES.

(2) 48—3=45 last term, less the first; and 45÷10—1=5 common difference. answer.

(3) 60—20=40 and 40÷21—1=2 com. diff. answer. Then 20=the age of the first; and 20+2=22 ditto of the second &c. &c.

(4) 60—6=54 and 54÷19—1=3 miles common difference.
Then, 60+6=66
× 19
1254÷2=627 miles, answer.

GEOMETRICAL PROGRESSION.

EXAMPLES.

1 2 3 4 5
(2) 2, 4, 8, 16, 32
×32
64
96
1024=10th power of the ratio.

continued

1024 = 10th power of the ratio.
× 1024
1048576 = 20th ditto.
× 1024
1073741823 = 30th ditto, less by 1
× 2 equal 1st. term.
12)2147483646 *d.*
2,0)17895697,0 6
3,0)894784,8 10 6 = amount.
answer *L.* 298261 12 4 = per bushel.

(3) 1 2 3 4 5
2, 4, 8, 16, 32
× 32
1024 = 10th power of ratio.
× 32
2,0)3276,7 = 15th ditto less 1
answer *L.* 1638 7*s.*

(4) 1 2 3
4, 16, 64 = 3d. power of the ratio.
× 64
4096 = 6th ditto.
× 4096
4 — 1 = 3)16777215 = 12th ditto, 1 deducted.
4) 5592405 qrs.
12)1398101¼
2,0) 11650,8 5¼
L. 5825 8 5¼ sold for
12 × 4 = — 48 0 0 bought for
answer *L.* 5777 8 5¼ gained.

(5) 1 2 3 4 4 + 4 = 8
2, 4, 8, 16, = 4th pow. of ra.; & 16 × 16 = 256 = 8th do.
8 + 8
256 × 256 = 65536 = 16th do.
× 65536
4)4294967295 = 32d. 1 subt.
12)1073741823¾
2,0)8947848,5 3¾
answer *L.* 4473924 5 3¾

(6) 1 2 3 4 5
3, 9, 27, 81, 243 = 5th power of the ratio.
5 + 5 = 10
and 243 × 243 = 59049 = 10th ditto.
× 59049
3—1 = 2)3486784400 = 20th do. 1 deducted.
1743392200
× 4 = first term.
barl. cor. in a pt. = 708,0)697356880,0
pints in a bushel = 64) 908016 } rejecting,
2s 6d. = ½) 14187 } remainders.
answer *L.* 1773 7 6

(7) 1 2 3 4 5 5 + 5 = 10
3, 9, 27, 81, 243 and 243 × 243 = 59049 = 10th power of ratio.
10 + 10 = 20
Then, 59049 × 59049 = 3486784401 = 20th ditto.
× 59049
1,00)205891132094 6,48 = 30th do. 1 deduct.
4)2058911320946 qrs.
12)514727830236½
2,0)42869398585,3 0½
L. 2144699292 13 0½ amount.
50*L.* × 30yds. = — 1500 0 0 deduct.
answer *L.* 21446977892 13 0½ gained.

(8) 1 2 3 3+3 = 6
2, 4, 8 and 8 × 8 = 64 = 6th power of the ratio.
× 64
4095 = 12th do. 1 subtracted.
× 21 = shillings in a guinea.
4095
8190
2,0)85995 shillings.
answer *L.* 4299 15

SIMPLE INTEREST BY DECIMALS.

EXAMPLES.

L. s. Princi. time. rati. interest *L. s. d.*

(2) 917 16=917,8×7×,05=321,23=321 4 7,2 answer.

L. s. Princi. ratio. commission *L. s. d.*

(3) 391 17=391,85 which×,045=17,63325=17 12 7,98

(4) 567*l.* 10=567,5 Principal.

9×,06= ,54 Time and ratio.

L. s.

L. 306,450=306 9= Interest.
\+ 567 10= Prin. } answer.
L. 873 19= amount.

(5) 4726*l* 18*s* 6½*d.*=4726,92708*L.* Princi.

3,5×,07= ,245 time and ratio.

L. s. d.

Product=*L.* 1158,09713560=1158 1 11,3=Inter.

(6) 9526*l.* 12*s.* 9*d.*=9526,6375=Principal.

12,75 × ,07 = ,8925 time and ratio.

Product=*L.* 8502,52397875=Interest.
\+ 9526,6375 =Principal.

answer *L.* 18029,16147875=Amt.=18029*l.* 3*s.* 2¾*d.*

ALLIGATION.

CASE 1.

EXAMPLES.

C.wt. *s.* *s.*

(2) Thus; 2 at 56=112 } By the rule of three direct.
1 at 43= 43 } +
2 at 50=100

Then, as 5 : 255 :: 3C.wt. : 7*l.* 13*s.* answer.

(3) Thus; 4 oz. at 5*s* =20*s.*
8 oz. at 4*s* =32*s.*

Then, as 12 : 52 :: 1 oz. : 4*s.* 4*d.* answer.

(4) Thus; Gal. *s. d.* — *d.*
12 at 4 10 = 696
24 at 5 6 = 1584
16 at 6 3½ = 1204
— — gal. *d.* *s. d.*
Then; as 52 : 3484 : : 1 : 67 = 5 7 answer.

(5) Thus; oz. Car. — Car.
8 of 22 — 176
1lb. 8 oz. = 20 of 21 — 420
10 of 18 — 180
— — oz. Car.
Then, as 38 : 776 : : 1 : $20\frac{8}{19}$ answer.

(6) Thus; lb. oz. — oz.
5 of 8 = 40
10 of 7 = 70
15 of 6 = 90
— — lb. oz. dwt. gr.
Then, as 30 : 200 : : 1 : 6 3 8 answer.

CASE 2.

EXAMPLES.

(2) Mean rate 18 { 24, 16, 12 } 2 + 6 = 8 qts. of Canay. 6 Sherry. 6 Malaga. } answ.

(3) 1st M. R 10 { 12, 11, 9, 8 } 2 at 12, 1 at 11, 1 at 9, 2 at 8 — 2d. M. R 10 { 12, 11, 9, 8 } 1 + 2 = 3 at 12, 2 at 11, 2 at 9, 1 + 2 = 3 at 8

lb. *s.*
3rd. M.R. 10 { 12, 11, 9, 8 } 1 at 12, 2 at 11, 2 at 9, 1 at 8 — 4th. M.R. 10 { 12, 11, 9, 8 } 1 + 2 = 3 at 12, 1 + 2 = 3 at 11, 1 at 9, 1 at 8

lb. *s.* lbs.
5th. M.R. 10 { 12, 11, 9, 8 } 2 = 2 at 12, 1 add 2 = 3 at 11, 1 = 1 at 9, 2 add 1 = 3 at 8 — 6th. M.R. 10 { 12, 11, 9, 8 } 2 add 1 = 3, 1 add 2 = 3, 1 add 2 = 3, 2 add 1 = 3 } 6 lbs. of each, answer.

(4) M.R. 7 — 4, 6, 11 — 4 = 4, 4 = 4, 3+1=4 — answer 4 of each sort.

(5) M.R. 4 — 3, 5, 7, 0 — s. 1 at 3, 1 at 5, 4 at 7, 3 of water, answer.

CASE 3.

EXAMPLES.

(2) M.R. 22 — 30, 36, 48, 18 — 4, 4, 4, 26+14+8=48 — Against the price of the given quantity stands 48. Therefore.

As 48bu. : 4bu. :: 12bu. : 1bu. of each sort. Answer.

(3) M.R. 22 — 16, 20, 24, 18, 0 — 2, 2, 2+4+22+6=34 — Against the given quantity stands 2, consequently the quantity for 16, 20 & 0 will be 10 oz.

Then, as 2 oz. : 34 oz. :: 10 oz. : 170 oz. answer.

(4) M.R. 28 — 48, 36, 24, 12 — 16, 4, 8, 20 — Against the price of the give nquantity. bu. p.

Then, as 16 : 4, 8, 20 :: 10 : 2 2, 5 0, 12 0 — 1st. ans.

Against the price of the given quantity.

Then, as 4 : 16, 20, 8 :: 10 : 40, 50, 20 — 2d. ans.

4+16=20 — Against the price, &c. bu.

As 20 : 16, 20, 28 :: 10 : 8, 10, 14 — 3d. ans.

16+4=20, 16+4=20, 20+8=28, 20+8=28 — Against the price &c. bu.

As 20 : 20, 28, 28 :: 10 : 10, 14, 14 — 4th. ans.

4+16=20, 8+20=28 — Against the price, &c. bu. p.

As 16 : 20, 8, 28 :: 10 : 12 2, 5 0, 17 2 — 5th ns.

M.R. 48, 36, 24, 12 — 16+4=20, 4, 20+8=28, 20, 4

Against the price, &c. bu. — 6th ans.

As 20 : 4 : 28 : 20 :: 10 : 2 : 14 : 10

Against the price, &c. bu. — 7th ans.

M.R. 28. 48, 36, 24, 12 — 4+16=20, 8+20=28, 8

As 4 : 20 : 28 : 8 :: 10 : 50 : 70 : 27

CASE 4.

EXAMPLES.

(2) M.R. 4, 5, 8 — 2, 2, 2+1=3

Sum of the difference=7

lb. lb. as 7 : 21 :: lb. lb. s. — 1st ans.

2 : 6 at 4
2 : 6 at 5
3 : 9 at 8

M.R. 7 — 4, 5, 8 — 1, 1, 3+2=5

Sum of the differ.=7

lb. lb. As 7 : 35 :: lb. lb. s. — 2d ans.

1 : 5 at 4
1 : 5 at 5
5 : 25 at 8

(3) M.R. 16 — 8, 12, 18, 22 — 6, 2, 4, 8

Sum. of diff.=20

lb. lb. As 20 : 120 :: 6 : 36; 2 : 12; 4 : 24; 8 : 48 answer.

(4) M.R. 33 — 48, 0 — 33, 15

48

gal. gal. Then, as 48 : 80 :: gal. gal. — ans.

33 : 55
15 : 25

(5) M.R. 18 — 15, 17, 20, 22 — 4, 2, 1, 3

10

Car. Car. Then, as 10 : 40 :: — 3d ans. 4th ans. 5th ans.

4 : 16 at 15
2 : 8 at 17
1 : 4 at 20
3 : 12 at 22

ans.

SINGLE POSITION.

EXAMPLES.

(2) Suppose A's age 20 — Then B's 30 — and C's 60 — Sum 110

As 110 : 132 :: { 20 : 24 A's age; 30 : 36 B's; 60 : 72 C's }

Proof 132

(3) Suppose 100 ÷ { $\frac{1}{4}$ = 25; $\frac{1}{5}$ = 20; $\frac{1}{6}$ = $16\frac{2}{3}$ } $61\frac{2}{3}$

Then, as $61\frac{2}{3}$: 74 :: 100 : 120 answer.

(4) Suppose 250*l.* whose interest for 10 yrs. = 150*l.* and 150*l.* + 250*l.* = 400*l.* Therefore, as 400*l.* : 500*l.* :: 250*l.* : 312*l.* 10*s.* answer.

(5) Suppose 20 min.
of an hour 20 min. = $\frac{1}{3}$ 54) 162 com. denominator.
of 2 hours 20 = $\frac{1}{6}$ 27
of 3 hours 20 = $\frac{1}{9}$ 18

$\frac{99}{162} = \frac{11}{18}$

Then as 11 parts : 20 min. :: 18 parts : 32 min. $43\frac{7}{11}$ sec. ans.

(6) Suppose 90*l.* Thus; 90 { ÷ $\frac{1}{3}$ = 30; ÷ $\frac{1}{4}$ = $22\frac{1}{2}$; ÷ $\frac{1}{6}$ = 15 } $67\frac{1}{2}$

From 90 Take $67\frac{1}{2}$ — $22\frac{1}{2}$

Then, as $22\frac{1}{2}$*l.* : 28*l.* :: 90*l.* : 112*l.* answer.

(7) Suppose 45 and 45 × 3 ÷ 5 = 27 which × 7 = 189
45 × 2 ÷ 3 = 30 +
219

Then, as 219 : 292 :: 45 : 60 years. answer.

(8) Suppose 100

$\frac{1}{3}$	$33\frac{1}{3}$
$\frac{1}{4}$	25
$\frac{1}{5}$	20
Sum	$78\frac{1}{3}$

Then, as $78\frac{1}{3}$: 100 :: 94 : 120 answer.

(9) Suppose 600, whose interest for 12 yrs. = 432 and 600 + 432 = 1032. Then, as 1032 : 600 :: 860 : 500*l.* answer.

(10) Suppose 80

$\frac{1}{3}$	$26\frac{2}{3}$
$\frac{1}{4}$	20
$\frac{1}{6}$	16
$\frac{1}{8}$	$13\frac{1}{3}$
Sum	76

Then, as 76 : 80 :: 57 : 60 answer.

(11) Suppose 100 scholars.

2					
$\frac{1}{2}$ | 200		Sch.	Sch.	Sch.	Sch.
$\frac{1}{3}$ | 50	Then, as	$308\frac{1}{3}$	: 333 ::	100	: 108
$\frac{1}{4}$ | $33\frac{1}{3}$		3	300	3	
25					
$308\frac{1}{3}$		925		300	

99900÷925=108 ans.

(12) Suppose 90*l.* Then 90÷$\frac{1}{3}$=30 & 90—30=60*l.* A lays out: and 60×2=120 B lays out; then 120—90 =30-which should be 50. Therefore, as 30*l.* : 50 : : 90*l.* : 150*l.* answer.

(13) Suppose 120,00*l.*

6

720,00

—600

L. 120

$\frac{1}{5}$)1200,0

600

Then, as 120*l.* : 100 :: 12000*l.* : 10000*l.* answer.

DOUBLE POSITION.

EXAMPLES.

(2) 1st. Sup. A had 15*l.* 2d. Sup. A had 25*l.*
Then, 15×2—8=22B. then, 25×2—8=42B.
and 15×3—15=30C. and 25×3—15=60C.

100—67=33 defect. 127—100=27 (Excess.

15×27=405
25×33=825

Sum 6,0)123,0

L.	*s.*		
20	10*s.*		A's part
20	10×2—8	=33 0	B's do.
20	10×3—15	=46 10	C's do.
Proof *L.*	100		

(3) 1st. sup. A paid 12 2d. Sup. A paid 16
Then 12+10=22 B. Then 16+10=26
and 12+22=34 C. and 16+26=42

100—68=32 defect. 100—84=16 def.

continued.

Then, $16\times32=512$ A paid $=30l.$
$12\times16=192$ B $20+10=30$ } answer.
C $20+30=50$
Differ. 16) 320
A paid *L.* 20 Proof *L.* 100

(4) 1st. sup. C's age 70 2d. sup. C's age 90
Then, $70\div2+20=55$ B's then $90\div2+20=65$ B's
and 20 A's and 20 A's
75 85
$75-70=5$ defect. $90-85=5$ Er. of (exc.

Therefore $70\times5=350$ From C's $=80$
$90\times5=450$
$80\div2+20=60$ B's
Sum 1,0) 80,0 add 20 A's
answer C's age $=80$ yrs. Take B & A's. $=80$
remains 0 the Proof.

(5) 1st. Sup. the body 30 inches. 2d. Sup. 40 inches.
Then, $30\div2+9=24$ tail. $40-2+9=29$
9 head. 9
$33-30=3$ def. $40-38=2$ excess

Therefore, $30\times2=60$ 36in. $=$ body.
$40\times3=120$ $36\div2+9=27=$ tail.
9 $=$ head.
Sum 5) 180
Whole length 72 in. $=6$ft, ans.
Leng. of the body $=36$ inches.

(6) 1st Suppose he worked 20 days.
Then 20 at $20d.=400d.$
and 20 idle at $10d.=200-$
$2l.\ 1s.\ 8d.=500d.-200=300$ Defect.
Therefore $25\times300=7500$
$20\times150=3000$
Difference 15,0) 450,0
answer, he worked 30 days.
2nd. Suppose 25 days at work.
Then 25 at $20d.=500$
and 15 idle at $10d.=150-$
$500-350=150$ defect.

continued,

For 30days at 20*d.*=600*d.*
10days at 10*d.*=100—
Proof. 500*d.*=2*l.* 1*s.* 8*d.*

(7) 1st. Suppose 4 of Damask. 2nd. Suppose 6 of Damask.
Then 4 at 8*s.*=32*s.* Then 6 at 8*s.*=48
and 11 at 3*s.*=33 and 9 at 3*s.*=27
3*l.* 10*s.*=70*s.*−65=5 defect. 75−70*s*=5 exc.
Therefore, 4×5=20 For 5yds. at 8*s.*=40
6×5=30 and 10 at 3*s.*=30
Sum 10)50 Proof 70*s*=3*l* 10*s.*

answer 5 yds. of damask and 10 lining.

(8) Sup. 1st. ½)400*l.* and 400 2d. Sup. 500*l.* and 500
+100 −225 −225 ½=125
500 175 275 625
−350 × 2 × 2 −550
Defect. 150 350 550defec.=75
Then, 500×150=75000
400× 75=30000
75)45000(600*l.* answer.

(9) 1st. Suppose the man 42, ⅓ of which is 14 for the wife.
14+15×2=58 2d. Sup. 48 +15=63
42+15= −57 of which ⅓=16 & 16+15×2=62
Error of excess 1 Error of defect. 1
Then, 42 1 42 45+15=60 his age when 15yrs. married.
48 1 48 15+15=30 his wife's do. do.
2)90 30=difference.

The husband 45 yrs. old. and the wife 15, answer. } As 8yr. : 16yr. :: 30yr. : 60yr. Proof.

PERMUTATION.

EXAMPLES.

(2) $1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11\times12=$ 479001600 Changes.

× 3

6,0)143700480,0 sec.

6,0)2395008,0

6)399168 hrs.

quar. of da. = 66528 dividend.

365¼ days = 1461qrs. Divis.

1461)66528(45yrs. 195da. 18hr. answer.

5844

8088

7305

783

4

days. hrs.

195¼ da. = 195 18

(3) $1\times2\times3\times4\times5\times6\times7\times8=$ 40320 changes, or days. Then $40320\times4=161280$

$= 110\frac{570}{1461}$ yrs. = 110yrs. 142 days.

$365\times4+1=1461$ answer.

(4) $1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11\times12\times13=$ 6227020800, which $\times14\times15\times16\times17\times18\times19\times20\times21\times22\times23\times24\times25\times26=$ 403291461126605635584000000 answer.

COMBINATION.

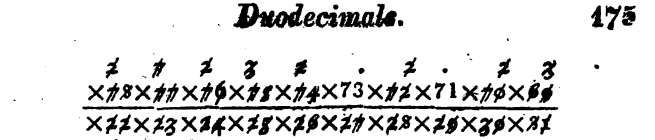
EXAMPLES.

(2) $\frac{24\times23\times22\times21\times20\times19\times18\times17\times16\times15\times14\times13}{1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11\times12}=$ 2704156 pence. = 11267*l.* 6*s.* 4*d.* answer.

(3) $\frac{\cdot11\quad 77\quad 76\quad 75\quad 74\quad 73\quad 72\quad 71\times70\times69\times68\times97\times96\times95\times94\times93\times92\times91\times90}{1\times2\times3\times4\times5\times6\times7\times8\times9\times10\times11}$

$\times\frac{89\times88\times87\times86\times85\times84\times83\times82\times81\times80\times79}{\times12\times13\times14\times15\times16\times17\times18\times19\times20\times21}$

continued,



DUODECIMALS.

ADDITION.

EXAMPLES.

Facit	314ft.	3in	6″	4‴	9″″				
(1)	Ft.	in.	″			(2)	Ft.	in.	
	1295	9	8				27	3	
	1295	9	8				25	11	
	1295	9	8				23	10	
	1295	9	8				20	9	
	1295	9	8				20	6	
	1295	9	8				18	5	
answer	6479	0	4				Ft. 136	8 in.	answer.

SUBTRACTION.

EXAMPLES.

						(2)	Ft.	in.
Ft.	in.	″	‴	⁗		From	41	7
2799	1	1	11	10	Facit.	Take	19	10
						answer ft.	21	9

MULTIPLICATION.

CASE 1.

EXAMPLES.

		Ft.	in.	″		
(2)	Multiply	28	10	6		
	By			3	2	4
		0	9	7	6	0
		4	9	9	0	
		86	7	6		
	answer feet	92	2	10	6	0

CASE 2.

EXAMPLES.

(2) Mul. ft. 82 in. 6 by ft. 13 in. 3
12+1=13ft.

	990	0	
In. 3=¼	82	6	
	20	7	6″
answer	1093	1	6

(3) Mul. ft. 79 in. 8×2.
By 6×6+2=38

	478	0	
		6	
	2868	0	
In	159	4	
6=⅓	39	10	
4=⅓	26	6	8″
1=¼	6	7	8
Facit	3100	4	4 answer.

(4) Mul. ft. 59 in. 9
By 4×6=24

	239	0	
6in.=½		6	
	1434	0	
	29	10	6
9)	1463	10	6
yds.	162	5ft.+ans.	

(5)
$$\frac{21{,}5\times 17{,}5}{1{,}5\times\ 1{,}5}=\frac{376{,}25}{2{,}25}=167+\text{ans.}$$

PROMISCUOUS QUESTIONS.

(1) 47 −21 = 26 A's age.
21 +60 = 81 B's.

(2) 25×2=50
5×2+20=30−
answer 20=the differ.

(3) Thus; 35 −30 = 5
35 +30 = 65
As 1day : 5 : : 7days : 35M. 65×7=45 5m. answer.

(4) Thus; As 2.5*L*. : 100*L*. : : 22.5*L*. : 900*L*. answer.

(5) A, B & C = 350*L*. / B, C & D = 345 / C, D & A = 400 / D, A & B = 378 — Then, 491−345 = 146 A's. / 491−400 = 91 B's. / 491−378 = 113 C's. / 491−350 = 141 D's. answer.

Num. combined = 3) 1473 — Proof. *L*. 491

A, B, C & D = 491*L*. whole sum.

(6) 10*s*. 6*d* = 10.5*s*. which ÷ 3 = 3.5*s* gain; and 10.5*s*. — 3.5*s* = 7*s*. first cost. Then say, as 7*s*. : 3.5*s*. :: 100*L*. : 50*L*. = gain per cent. and 12*s*. — 7*s*. = 5*s*. as 3.5*s*. : 50*L*. :: 5*s*. : 71*L*. 8*s*. $6\frac{6}{7}$*d*. per cent. answer.

(7) $\frac{2}{3}$ of $\frac{3}{4}$ = $\frac{6}{12}$ = $\frac{1}{2}$. Therefore, as 1 part : 1260*l*. :: 4 parts : 5040*L*. answer.

(8) 275*L*. — 250*L*. = 25*L*. gain.

As 250*l*. in 3 mo. > 25*L*. < 100*l*. 12mo. > 40*L*.

For 100×12×25 ÷ 250×3 = 40*L*. answer.

(9) 3500 — 2500 = *L*. 1000. As 25,00*L*. in 8 yrs. > 1000*l*. < 1,00*l*. 1yr. > 5*l*.

For 1000 ÷ 25×8 = 5*l*. per cent. answer.

(10)

mo.	5*l*.	
6 = $\frac{1}{2}$	—	
3 = $\frac{1}{4}$	2	10
	1	5
	3	15
	100	0
	103	15

As 103*L*. 15*s*. : 100*l*. :: 200*l*. : 192*l*. 15*s*. $5\frac{5}{13}$*d*. And 192*l*. 15*s*. $5\frac{5}{13}$*d*. — 150*l*. = 42*l*. 15*s*. $5\frac{5}{13}$*d*. answer.

(11) First, Suppose 4 o'clock; then 12 — 4 = 8 remains, and $\frac{4}{5}$ of $\frac{8}{4}$ = $\frac{32}{5}$ = 6.4. Then 6.4 — 4 = 2.4 Error of defect: 2d. Suppose 5 o'clock; 12 — 5 = 7 remains, and $\frac{4}{5}$ of $\frac{7}{1}$ = $\frac{28}{5}$ = 5.6; then 5.6 — 5 = .6 Error of defect. Therefore,

5×2.4 = 12.
4× .6 = 2.4.

differ. 1.8) 9.6) 5.333+ = 5hr. 20min. time required. ans.

(12) First, 12 — 1 = 11 the difference of velocity between the hour and minute hands. Then say, as 11 : 1 :: 12×4 : $4\frac{4}{11}$hr. or $21\frac{9}{11}$ min. past 4. answer.

(13)

Gal.	*s*.	*d*.	*s*.
12 at 6	4	= 76	
18 at 4	10	= 87	
12 at 3	1	= 37	

Then, as 168qts. : 200*s*. :: 1qt. : $1\frac{4}{21}$*s*. and as 100*l*. : 110*l*. :: $1\frac{4}{21}$*s*. : 1*s*. $3\frac{4}{7}$*d*. per qt. answer.

Gals. 42 = 168qts. 200*s*.

(14) Thus, inversely, as 5yr. 5mo. : 210*l.* 3*s.* : : 3yr. 3mo. Or, As 65mo. : 4203*s.* :: 39mo. : 7005*s.* = 350*l.* 5*s.*

For $4203 \times 65 \div 39 = 7005s. = 350l.\ 5s.$ answer.

(15) Take 50*l.* and say, inversely, as 100*l.* : 5yr. : : 50*l.* : 10yr. In 10 years 50*l.* will gain 22*l.* 10*s.*; but to find in what time 50*l.* will gain 50*l.* say, as 22*l.* 10*s.* : 10yr. : : 50*l.* : $24\frac{6}{11}$ yrs. answer.

(16) $350 \times \text{Prin.} \times 4 \div 100 = 14l. =$ interest for 1 year.

$4 \times 8 = 32l.$ 8

$+ 100$ —

112*l.* = ditto. for 8 yrs.

As 132 : 32*l.* : : 350 : 84*l.* $16\frac{3}{11}s.$ rebate.

Then $112l. - 84l.\ 16\frac{3}{11}s. = 27l.\ 3\ \frac{1}{8}s.$ in favour of interest. ans.

(17) $100l + 20l. = 120l.$ Then, as 50*s.* : 120*l.* : : 45*s.* : 108*l.* and $108l. - 100l. = 8l.$ per cent. gain. answer.

(18) First, $100 - 17 = 83l.$ and $100 + 20 = 120l.$ Then say, as 83*l.* : 63*l.* : : 120*l.* : 91*l.* 1*s.* $8\frac{20}{83}d.$ And 91*l* 1*s.* $8\frac{20}{83}d. - 63l. = 28l.\ 1s.\ 8\frac{20}{83}d.$ answer.

(19)

$\frac{1}{3}$	4*d.*
$\frac{1}{4}$	$1\frac{1}{3}$ ·· 2 (6 com. divi.
	$0\frac{4}{8}$ 4
	+1

answer 2 pence.

(20) $6 \times 12 \times 12 = 864 = 6$ doz. doz.

$6 \times 12 = 72 = \frac{1}{2}$ doz. doz.

answer 792 difference.

(21) First, Suppose 100. Then $100 \div 2 = 50$ & $50 + 15 = 65$

$100 \div 3 = 33\frac{1}{3} + 10 = 43\frac{1}{3}$

and $100 - 65 = 35$

Error of defect $8\frac{1}{3}$

2nd. Suppose 120

Then $120 - 2 = 60 + 15 = 75$

$120 \div 3 - 10 = 50$

$120 - 75 = 45$

Error of defect 5

Therefore

$120 \times 8\frac{1}{3} = 1000$

$100 \times 5 = 500$

difference $3\frac{1}{3})\ 500$

3 3

thirds 1,0)1,50,0

answer 150 members.

(22) First, Suppose 8 Beggars, then $8\times3-8=16$, and $16\div8=2$, and nothing over, so the defect is 3.

2nd. Suppose 9 Beggars, then $9\times3-8=19$ and $19\div9=2$ and 1 over, which should be 3, so the defect is 2. Therefore

$$\begin{array}{r} 9\times3=27 \\ 8\times2=16 \\ \hline 1)\ 11(11 \text{ Beggars, answer.} \end{array}$$

For $11\times3-8=25$
and $25\div11=2d.$ each, and $3d.$ over. Proof.

(23) Answer $99\frac{2}{9}$. For $99\frac{2}{9}=\frac{900}{9}=100$

(24) Let the principal be $50l$ and $50\times2=100l.$ Amount, and $100-50=50$ Interest, then

$50\times.06=3.00)50$

16.6666 yrs. = 16 yrs. 8mo. answer.

(25) $8s.\ 11\frac{1}{4}d.=429$qrs.

$=39$ Scholars, answer.

$2\frac{3}{4}d.=11$

(26)

$\frac{1}{2})360$
$69\frac{1}{2}$
3240
2160
180
2,0 2502.0
$365\frac{1}{4}$ 1251
4 4
1461) 5004(3yrs. $155\frac{1}{4}$da. ans.
4383
4)621
$155\frac{1}{4}$ days.

(27) $5L.$ 100

$L.$ $L.$ $L.$ $s.$ $d.$
As 105 : 100 :: 74.9 : 71 6 8
100
105)7490.0(71 6 8 ans.

(28) $100\times3\frac{1}{4}=325$
$150\times4\frac{1}{2}=675$
$204\times5\frac{3}{4}=1173$
454)2173(4 $23\frac{61}{454}$
1816
357, &c.
mo. days.

(29) Thus; As 16 parts : $1400l.$ :: 3 parts : $262\frac{1}{2}l.$
3

$4200\div16=262l.\ 10s.$ answer.

(31) Stated thus; As $\frac{1}{4} : 7\frac{3}{8} \; \frac{3^6}{5} :: \frac{8}{7} : 6\frac{1}{3}\frac{8}{5}$ E.E.

For $\frac{3\times38\times8}{4\times\ 5\times7} = \frac{912}{140} = 6\frac{1}{3}\frac{8}{5}$ E:E.

Then inversely, As $5 : 6\frac{1}{3}\frac{8}{5} :: 4 :$ 8yds. 0qr. $2\frac{3}{7}$na. ans.

(32) $7\frac{1}{3} = \frac{22}{3}$ and $8\frac{4}{5} = \frac{44}{5}$ Then,

As $\begin{cases} 22 : 1 \text{ work} :: 3 : \frac{3}{22} \text{ .. } 132\ 968 \text{ common denomina.} \\ 44 : 1 \qquad :: 5 : \frac{5}{44} \text{ .. } \frac{110}{242} \end{cases}$

Therefore, as 242 parts : 1w. :: 968 parts : 4 hours. ans.

(33) $\frac{1}{2}, \frac{1}{6}, \frac{1}{6}$ are $= \frac{6+3+2}{12\ \ 12\ \ 12} = \frac{11}{12}$

and $\frac{12}{12} - \frac{11}{12} = \frac{1}{12} = 60+40 = 100$ trees. Then, as $\frac{1}{12} : 100$ trees :: $\frac{12}{12} : 1200$ trees. answer.

(34) $\frac{5}{8}$ of $\frac{2}{7} = \frac{10}{40} = \frac{1}{4}$ Therefore, as $\frac{1}{4} : 375 :: \frac{4}{4} : 1500l.$ ans.

(35) $\frac{5}{7}$ of $\frac{3}{8}$ of $\frac{4}{5} = \frac{60}{280} = \frac{6}{28}$, and $\frac{2}{9}$ of $\frac{7}{8}$ of $\frac{12}{10}$ of $\frac{1000}{1} = \frac{7000}{360}l.$

Then as $\frac{6}{28} : \frac{7000}{360} :: \frac{28}{28}$, or, $\frac{6\times7000\times28}{28\times\ 39\ \times28} = 837L.$

12*s.* $1\frac{2}{39}d.$ the cost of the ship. And $1000L. + 837L.$ 12*s.* $1\frac{2}{39}d. = 1837L.$ 12*s.* $1\frac{2}{39}d.$ answer.

(36) Thus; as 7 : 1560 :: 12

12

7)18720

$\frac{2}{7} = \frac{1}{4}$ | 2674 $\frac{2}{7}$

5 $\frac{5}{8}$

13371 $\frac{3}{7}$ .. 24(56 common. denomina.

$\frac{1}{8} = \frac{1}{3}$ | 668 $\frac{16}{21}$ .. 32

334 $\frac{16}{56}$ .. 16

$\frac{1}{5}$)14374 $\frac{2}{7}$

479 $\frac{14}{7}$

$L.\ 19165\frac{5}{7} = 19165l.$ 14*s.* $3\frac{3}{7}d.$ answer.

(37) $\frac{16}{16} - \frac{5}{16} = \frac{11}{16}$ and $\frac{3}{4}$ of $\frac{5}{8}$ of $\frac{11}{16} = \frac{165}{384} = \frac{55}{128}$; Then the fractions are $\frac{11}{16}$ and $\frac{55}{128}$ which brought to a com. denom. are $\frac{1408}{2048}$ and $\frac{880}{2048}$, then $\frac{1408}{2048} - \frac{880}{2048} = \frac{528}{2048} = 537L.$

Therefore, as 528 parts : $537L.$ :: 2048 parts : $2082L.$ 18*s.* $2\frac{2}{11}d.$ answer.